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On Cyttaria Berk. and Cyttariella n. gen.

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The family of *Cyttariaceae* is still very imperfectly known. This applies equally to the position of the family systematically and to the different species which are comprised in the genus *Cyttaria* Berk. In the literature the existence of eight distinct species has been accepted, excluding two rather doubtful species *(C. Purdiei* and *C. disciformis* Lév.). With this view the present writer is in agreement, and adds in this paper one new very distinct species to the already recognized ones; overmore, a new form genus *Cyttariella* has been created to include two Cyttaria-like pycnidbearing stromata which seem to belong in the development-sphere of some members of *Cyttariaceae.* Recently Spegazzini (14) has advocated the opinion that all up till now kown species, with the exception of *C. Hookeri* Berk., only represent different stages in the development of *C. Darwini* Berk. In view of the conflicting opinions it is hoped that the following notes may further the knowledge of these interesting and little known fungi.

The material at hand for these notes was exceptionally well preserved and accompanied by ample field notes. One of the reasons for our lack of knowledge regarding the Cyttarias is mainly to be sought in the difficulty of preserving the material when collected, in such a way that it can be conveniently used for research work. The samples that reach the student have generally been preserved by drying; it is then perfectly impossible to use them for life history work, even the proper determination of the samples being then, at least, very difficult.

Professor Dr. C. Skottsberg, when a member of the Swedish Antarctic Expedition 1901—1903, collected some species of *Cyttaria* during a stay in Tierra del Fuego. At the same time, he was able to make some valuable notes regarding the seasonal occurrence of *Cyttaria Darwini* Berk. and *C. Hookeri* Berk., and regarding the variability of the former species. Unfortunately most of the material was lost in the shipwreck of S. S. „Antarctic", but what remains of it has proved to be of marked interest.

In the following account of Skottsberg's material has been included, overmore, a survey of a collection of Cyttarias brought home to Sweden by Dr. O. Borge from a botanical expedition to Southern Patagonia.

To Professor Dr. C. Skottsberg my thanks are due not only for the field notes that he kindly has put at my disposal, but also for a revision of my manuscript including the modern denomination of the Nothofagus-host plants.

1. **Cyttaria Darwini** Berk.

This species was collected on *Nothofagus* sp. by O. Borge in Port Arthur, Patagonia. C. Skottsberg collected it in various places: Ushuaia, Harberton; regarding host plants see beneath.

In current descriptions of *C. Darwini* the colour of the soft stroma is generally given as white to whitish. Thus Spegazzini (13, p. 121) calls it „alba vel albo-pallescens", and Fischer (5) says „weiß oder blaß gelblich". The original notes of Darwin and Berkeley are in contradiction to these statements. Darwin (4) speaks of *Cyttaria* as a „bright yellow fungus" and in his notes, handed over to Berkeley and inserted in his description, we read „colour ochre yellow and Dutch orange". He found *C. Darwini* on the evergreen *Nothofagus betuloides.* Fischer (7) quotes the same host plant, without telling us what the specimens collected by Hariot and referred to *C. Darwini* („but almost white!") had grown upon. Hariot (6) himself gives *N. betuloides* and *N. antarctica,* Rehm (11) and Spegazzini (11) only *N. antarctica* as host plants.

According to Skottsberg, however, there seem to exist forms or varieties of this species, distinguished from each other by different colouring of stroma and hymenium. Together with these variations in colour they are said to differ with regard to certain biological characters as time of ripening, hostplant, etc.

Unfortunately, the material referred to in the notes given below has been lost: it is therefore now impossible to make out, if we have to do in all cases with the real *C. Darwini* Berk. or not.

The notes were taken in the field, all the forms being termed as „*C. Darwini*"; most likely they belong to three different varieties or species. A thorough revision of the genus is necessary. However, our knowledge of Cyttarias regarding their natural habitat as well as their variability being still extremely limited, every contribution might be of value. The notes of Skottberg have been corroborated by informations, given to him by Mr. W. Bridges who, during a number of years, has been in a position to observe the Cyttarias in nature.

Skottsberg distinguished the following „forms" of *C. Darwini*: „*f. vulgaris*" (Skottsberg in litt.).

The body of the ripening stroma is of clear yellow colour, with spots of a lighter shade; these spots indicate the location of the perithecia. The light coloured spots widen as the ostiolum of the perithecium enlarges, still being covered by the skin of the stroma. This skin then bursts, laying bare the hymenium which always shows an orange yellow colour.

The fungus is said to be ripe generally in October, although apparently being able to continue growth the whole year round, as undeveloped specimens were collected by Skottsberg in March.

As already reported by older travelers, the Cyttarias in general are without special taste or aroma; the *f. typica* makes no exception from this rule according to Skottsberg.

Very common on *Nothofagus pumilio* (Toepp. et Endl.) Krasser.

According to Skottsberg this may be what Spegazzini (12, p. 122) calls *C. Berteroi* Berk. growing on *N. obliqua* „in Fuegia tota". It is true that this is the host plant of the original *C. Berteroi,* but this came from San Fernando (Darwin) in C. Chile, province of Colchagua (34—35° s. L.). *N. obliqua* is, of course, totally absent from Patagonia or Tierra del Fuego, not going beyond 41° 30′ on the Chilean side, and Skottsberg adds that most likely *C. Berteroi* is equally absent. Spegazzini's Fuegian *N. obliqua* he considers to be *N. pumilio.* The trunk figured on the Cyttaria-picture in Alboff's (1) paper seems to be *pumilio.*

„f. Bridgesii" (Skottsberg in litt.).

The stroma is light yellow to almost white; with reddish spots above the ripening but still enclosed perithecia. The hymenium when laid open is of a more reddish shade than in *f. typica.* Forma *Bridgesii* ripens in the same season as *f. typica,* and is thus a winter fungus; it is, too, reported to lack aroma.

It has until now exclusively been found on *Nothofagus antarctica* (Forst.) Blume. Skottsberg points out that this form ought to be identical with *C. Darwini* of Spegazzini, of a whitish colour and growing on *N. antarctica.* It may also be Rehm's *Darwini,* possibly also Fischer's, but Skottsberg does not believe that it is identical with the true *„Darwini"* of Darwin and Berkeley. Several Fuegian names, applicable, according to Spegazzini, to different stages, were quoted by this author, and two of these names, though spelt in a slightly different way, are also found in Hariot's paper, applying, according to the missionary Mr. Bridges Sr., to a summer species. But Spegazzini expressly states that his *C. Darwini* is a winter fungus. Skottsberg does not believe that Bridges, who lived many years with the Fuegians, is mistaken, thus the vernacular names should rather be attached to the next form.

„f. *Onae* (Skottsberg in litt.).

This form has a stroma of an orange yellow colour; the colour of the hymenium is not known.

This form ripens, according to W. Bridges, a son of the missionary mentioned, during the summer months; in November 1902 Skottsberg could only find old and already dried fruiting bodies or very young ones. *F. Onae* shall have a sweet flavour; natives of the Fuegian Ona tribe

told Skottsberg that they could very well distinguish between the three fungi (as described above), and that this (f. *Onae*) was the best one.

On account of colour and hostplant this would be the fungus collected by Darwin, i. e., the true *C. Darwini,* though Berkeley admits he possibility of two species being included under this. Still, the bright yellow Cyttaria on the evergreen beech very likely should be considered as the type. Darwin's figure shows a globular stroma with a short, slightly tapering base. And Darwin collected his specimens from December to June, and asserts that they had a sweet taste. Hariot's specimens from *N. betuloides* may belong here. Spegazzini (13, p. 122) mentions a species of sweet taste, growing on the same kind of beech but calls it white; he lost the material, curiously enough, also in a shipwreck.

It remains to be decided whether *C. Harioti* Fisch., growing on *N. betuloides,* is different from Berkeley's species. If this be the case, there are two species on the evergreen beech (Skottsberg in litt.).

Its hostplant is *Nothofagus betuloides* (Mirb.) Blume.

In absolute contradiction to the above stand the recently published notes on *C. Darwini* Berk. of Spegazzini (14, p. 19—22) who, like Skottsberg, has had the opportunity of seeing the Cyttarias in the field. His statements there are so emphatic that they deserve to be (in part) reproduced (translated from the Spanish text). After stating that according to him there exist only the two species, *C. Darwini* Berk. and *C. Hookeri* Berk., he proceeds (p. 19) . . . „never, I repeat, have I seen big *Cyttariae,* young or old that showed a yellow colour; they were always white and smooth, like billiard balls; a few (on *N. betuloides*) under certain conditions take on externally a light rose colour, while the surface turns opaque and rough (these I attributed to *C. Berteroi* in Fungi Fuegiani no. 313) somewhat like the skin of a potatoe, but this is an abnormality and at present I feel sure that this is only a pathological form, caused by some parasite" — „I am absolutely convinced that there exists only one big *Cyttaria* and that this fungus when normal and sound is always white; thus we shall give to this species the first name published, *Cyttaria Darwini* Berk., with, accordingly, *C. Berteroi* Berk., *C. Harioti* Fisch. and *C. Reichei* Henn. as synonyms".

The following description of the different forms, — thus, according to Spegazzini (14, p. 20) only development stages — under which his *C. Darwini* appears in Nature, is given by him in Latin and is quoted here in full:

I. Forma *juvenilis:* Globosa v. obovata (1—3 cm diam.) superne laevissima, alba, inferne rotundata v. plus minusve cuneata laevi v. radiatim plicatula, ubique cortice integro crassiusculo (0,5—1,5 mm crass.) tenacella gummoso-carnosa alba opaca vestita; intus tota farcta etiam alba, carne quam cortice magis gummosa et pellucida, obsolete tenuiterque radiatim reticulato-pseudofibrosa; loculi plus minusve numerosi, magni

et regulariter dispositi periphaerici in carne immediate sub cortice dispositi globosi (1—2 mm diam.) pulpa hymeniali, e fibrillis tenuibus centrifuge radiantibus constituta, toti farcti.

II. Forma *adulta:* Globosa v. obovata (3—4 cm diam.) extus cortice adhuc albo v. quandoque roseo-subvinoso vestita, primo jam attenuato et magis pellucido extus plus minusve manifeste areolato-subpapuloso, serius grosse poroso-alveolato; intus jam gelatinoso-subhyalina, parte centrali infera plus minusve diffluente saepeque vacua; loculi periphaerici, quandoque omnes bene evoluti et magnitudine aequales (2—3 mm diam.), quandoque pro parte abortivi et pro parte evoluti e tum saepius majores et plus minusve irregulares (4—6 mm diam.) ore, foveolis corticis respondente, late aperto integro v. denticulato, tunica hymeniali crassiuscula parietali praediti, centro vacui v. gelatina achroa adhuc farcti; stratum hymeniale e filamentis v. paraphysibus nec non ascis plus minusve evolutis jam compositum.

III. Forma *senescens:* Lenticulari-depressa v. difformis (4—7 cm diam. ≷3—5 cm crass.), cortice diffluente jam omnino denudata, tremelloideo-carnosa, ob loculos v. alveolos periphaericos late apertos plus minusve numerosos favosa, loculis ovatis ore integris irregulariter polygonis, vacuis v. strato hymeniali gelatinoso, paraphysibus ascis nec non sporis constituto, plus minusve obductis; color tum sordide isabellinus v. pallide ochraceus.

It should be born in mind that Spegazzini bases this classification largely on the size and external appearance of the stroma, disregarding such important characters as those derived from the colour of the hymenium, the distribution of the pycnidia (when present), the size of asci and spores, etc. In how far the above description refers to *C. Darwini,* is thus, at least, doubtful. For obvious reasons the current conception of species in the genus *Cyttaria* has been adhered to, as will be seen in the analytical key of the genus given in the present paper (p. 413). On the other hand the above citation from Spegazzini's paper serves to emphasize the need for additional, adequate field information regarding the species of *Cyttaria.*

2. **Cyttaria Harioti** Fisch.

This *Cyttaria* seems to belong to the more rare species; as far as I know, it has till now been found only in Fuegia by Hariot (see Fischer 5) at Punta Arenas and by Dusén („dilute aurantiaca", on *N. betuloides*) (See Rehm 11).

The specimens, collected by Borge (without locality: on *Nothofagus* sp.), are interesting as they show the fungus in situ, on a branch of Nothofagus. The stromata form a dense cluster on the branch which has been markedly deformed by the mycelium of the fungus. The deformation caused resembles very much those described by Fischer (7) and by Bommer & Rosseau (3) as caused by *C. Hookeri* Berk. viz. *C. Darwini* Berk. on their hostplants.

3. Cyttaria Hookeri Berk.

Skottsberg has collected this species in different localities in Tierra del Fuego where it, according to him, is rather common on *Nothofagus pumilio* and *N. antarctica*. The perithecia show ripe asci in October.

The form on *Nothofagus antarctica* is, according to Skottsberg, characterized by a lighter colour of the stroma. Unfortunately no specimens have been preserved of this form. It must not be forgotten that the type was collected (by Hooker) on *N. antarctica* in Hermite Island, where *N. pumilio* does not occur, and is described as „pallide fusca" (see Fl. Ant. p. 247). After Spegazzini (18, p. 122) it occurs on *N. obliqua* and *N. antarctica*, being characterized as *„flavescenti-cinnamomea"*. He mentions a form on *N. betuloides*. According to Fungi patag. (11) he found it on *N. antarctica* and *N. betuloides*. Hariot collected it on *N. antarctica*. It remains to be decided, if we have to do with different forms on different hostplants; this is not at all impossible.

4. Cyttaria intermedia n. sp.

Among the collections brought home by Borge there is a rich material of a *Cyttaria*, belonging to the same type as the well known *C. Hookeri* Berk. It differs, however, in some important respects from that species, at the same time showing a certain resemblance to the species with bigger stromata. It is described here as a new species.

The fully developed stroma has a shape of a very small pear. From a narrow stalk of some mm length, it gradually enlarges to reach its maximum width beneath the apex which shows a more or less distinct, pointed top. Fig. 1 shows four not yet full grown stromata (upper row) and three full sized ones (central row). The dimensions of the type stromata vary from 1,5 to 2 cm in length and 1 to 1,4 cm in width; *C. Hookeri* is up to 1,5 cm long and from 4 mm to 6 mm broad. As in *C. Hookeri*, the perithecia are located in the uppermost part of the stroma, where they generally occur at about the same height, opening out on the flattened apical part of the stroma. From 5 to 7 perithecia are developed in one stroma; fig. 1 (middle row to the right) shows a stroma from above with perithecia arranged in a characteristic way, forming a circle around the protuding point of the stroma. The perithecia originate here more close to the stroma-surface than in the bigger *Cyttaria* species (fig. 1, lowest row: the middle figure of that row shows a stroma with a young perithecium developed more to the middle of the stroma than usual). The fresh color of the fruit body has possibly been whitish or yellowish; because of the method of preservation (60 % alcohol) the original colour may have undergone a change to the brownish yellow of the sample. The whole surface of the stroma shows a great number of minute black dots (see fig. 1, upper row); each dot represents a submerged pycnid fructi-

fication which in *Cyttaria* generally is designated as a „spermogonium". In the distribution of these pycnidia all over the stroma *C. intermedia* differs from all known Cyttarias where pycnidia have been described. In *C. Hookeri* with which species it certainly is closely related, the pycnidia are, according to Fischer (7), limited to the upper part of the stroma, a statement which I can corroborate. The stroma is solid during all stages of development observed and shows a central, very characteristic dark-coloured vein or strand of brown-coloured hyphae from which thinner veins are branching off (fig. 1, lower row).

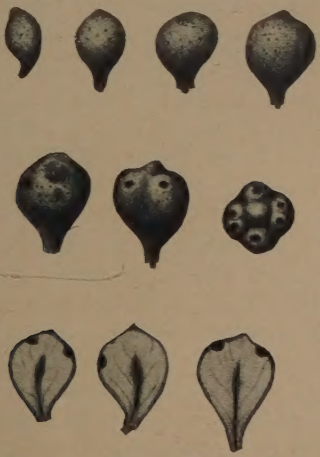


Fig. 1. *Cyttaria intermedia* Palm n. sp. — Upper row: young stromata; obs. distribution of the „spermogonia"; middle row: ripe stromata; lower row: longitudinal section through maturing stromata — Nat. size.

The perithecia are, as mentioned, all situated in the apical part of the stroma. When completely ripe, they protrude slightly above the smooth stroma surface; they are about 1,5—2 mm in diameter. Nothing is known about the colour of the hymenium. The asci, which measure 220—270 μ × 11—15 μ, are imbeeded among very slender cellular paraphyses, of about the same length as the asci. The state of preservation of the samples made it rather difficult to arrive at exact measurements; this applies equally to asci and spores. The spores which appear faintly brown-coloured, are oblong with rounded ends, and measure 14—16 μ in length and ± 10 μ across.

The immersed pycnidia contain hyaline sterigmata, producing minute, 2—3 μ big, oblong to rounded, conidia.

C. intermedia n. sp. was collected on *Nothofagus sp.* by Dr. O. Borge at Port Arthur in Patagonia.

Cyttaria intermedia n. sp. Stromate pyriformi superne applanato sed distincte apiculato (flavescente?) 1,5—2 cm alto, 1—1,4 cm crasso, intus pallido, chorda centrali olivascente ramos emittente instructo; peritheciis 5—7, in parte superiore applanata stromatis immersis annulum formantibus, globoso-obovatis, 1,5—2 mm diam.; colore hymenii ignoto; ascis 220—270 μ × 11—15 μ; paraphysibus filiformibus cellularibus; sporis obtus rotundatis, 14—16 μ = 10 μ, pallide olivascentibus; spermogoniis in superficie stromatis aequaliter distributis, conidiis oblongo-rotundatis, 2—3 μ diam.

Hab. ad *Nothofagum* sp. Patagonia, Port Arthur, leg. *O. Borge.*

Most authors who have written about *C. Hookeri* Berk. find that this species ought to form a separate genus. *C. intermedia,* however, though in fact standing nearer to *C. Hookeri* than to the rest of the *Cyttaria*-species, forms, it seems to me, in various respects a connecting link between *C. Hookeri* and bigger species. With regard to the size of the stroma, the new species stands between *C. Hookeri* Berk. and *C. Berteroi* Berk. As the perithecia are not always confined to the utmost apical part of the stroma, *C. intermedia* in this respect comes near *C. Gunnii* Berk., which has perithecia only in the upper part of the stroma. Also with regard to the distribution of the pycnidia (spermogonia) the new species occupies an intermediate position between *C. Hookeri* where the pycnidia are concentrated to the apex, and species such as *C. Darwini* Berk., with exclusively basal pycnidia. Other intermediate species may be found when the Nothofagus-forests in Patagonia and elsewhere have become better explored by mycologists. It would thus seem to me that, at present at least, there is no necessity for splitting up the old *Cyttaria* into two certainly very closely related genera.

5. Analytical key to the genus Cyttaria.

In order to facilitate determinations of Cyttaria-collections — the litterature is not easily available — the following key is given. As already mentioned under *C. Darwini,* Spegazzini (14, l. c.) recognizes only two species of *Cyttaria,* and refers all described species, with the exception of *C. Hookeri* Berk., to *C. Darwini* Berk.: „After having seen and examined thousands and thousands of specimens in every stage of development, living and dead, dried or preserved in various preservation fluids, I am convinced that there only exists two South American species of *Cyttaria;* the big white and the small yellow one *(C. Darwini* and *C. Hookeri)*". For reasons given in my notes to *C. Darwini* in the present paper, it has not been thought expedient to follow Spegazzini. *C. Purdiei* Berk., and *C. disciformis* Lév., have not been included, the available data being too incomplete.

A. Pycnidia apical . . . . . *C. Hookeri* Berk.
B. Pycnidia evenly distributed over the stroma . . *C. intermedia* n. sp.
C. Pycnidia basal or absent (unknown?).
  a) Perithecia only in the upper half of the stroma *C. Gunnii* Berk.
  b) Perithecia distributed practically all over the stroma.
    I. Stroma reniform to pearshaped with gradually tapering base, on *Nothofagus obliqua*.
      1. Stroma 6—7 cm high and 4,5—5,5 cm in diam., globose with a robust stalk, hollow . . . . . *C. Reichei* P. Henn.
      2. Stroma 3—5,5 cm in diam.; less regular in shape, solid . . . . . *C. Berteroi* Berk.[1]).
    II. Stroma globose — reniform, more abruptly narrowed into a short stalk; on the Fuegian beeches.
      1. Perithecia contiguous, dissepiments very thin . . . . . *C. Espinosae* Lloyd.
      2. Perithecia more or less contiguous, dissepiments thick.
        Stroma 3—5 cm in diam. . . . . *C. Darwini* Berk.
        Stroma 2—2,5 cm in diam. . . . . *C. Harioti* Fisch.

6. **Cyttariella** nov. gen.

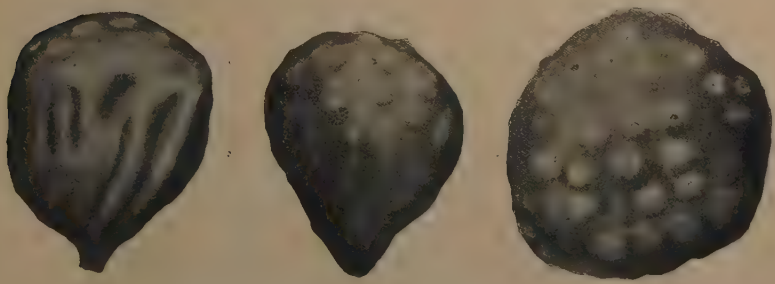
The most interesting part of Skottsberg's collection consists of two samples of a small Cyttaria-like fungus, growing on younger twigs of *Nothofagus betuloides* (Mirb.) Blume. It was collected in Tierra del Fuego near Ushuaia, at a waterfall of the Rio Olivia. The fungus in question has a fruiting body or stroma of a dark brown or blackish colour (dried specimens), plumpily pearshaped (Figs. 2a, 4a, b). It measures from 3 to 4 mm in length and 2 to 3 mm in diam. The stromata generally develop in two rows, running parallel along the twigs to which they are attached; figs. 2b and 4, showing twigs which have carried a number of stromata, give a good idea of this parallel arrangement. The youngest twigs on which they are found in the material at hand, are probably not more than one growth season old, the oldest ones (about 1 cm in diam.) show 5 yearrings. The stromata probably originate on the border-line between wood and bark; both tissues constantly are more or less hypertrophied by the action of the mycelium. The bark layer ruptures longitudinally by the emerging fruiting bodies. After the stromata have fallen out, the points of attachment remain visible through the ruptured bark as circular white spots in the wood.

[1]) The measurements given by Hennings (7) are much smaller and refer to a specimen, collected by Poeppig; if belonging here, I cannot tell.

Fig. 2. *Cyttariella Skottsbergii* Palm n. sp. — *a* Stromata in position on young branch of *Nothofagus betuloides* (Mirb.) Blume. *b* Branch of *N. betuloides*, showing parallel arrangement of stromata; only the points of attachment of stromata visible. — Nat. size.

Under the lens, a number of minute ostioli can be seen in the flattened apex of the fruiting-bodies. In analogy with *Cyttaria* one would expect to find these ostioli to correspond to as many perithecia. However, the microscopical examination — possible only after boiling the stromatas in lactid acid (10 %) — shows that we have to do with pycnidia imbedded in the stroma.

Fig. 3. *Nothofagus betuloides* (Mirb.) Blume — Branches of various age, showing deformations caused by *Cyttariella Skottsbergii* Palm n. sp. — Nat. size.



a *b* *c*

Fig. 4. *Cyttariella Skottsbergii* Palm n. sp. — *a* & *b*, Pycnid stromata in side view; *c* stroma from above — M. 10/1.

These pycnidia are from about 200 till 300 μ in diam. Being separated from the white mycelial tissue of the stroma by a zone of brown-coloured hyphae, they occur in the flattened top of the stroma, generally in a number from 10 to 20; on stromata of the largest size as many as 25 have been counted. The short hyaline sterigmata, showing remarkably blunt tips, form a very uniform covering of the interior of the pycnidia. The minute conidia, developed in great numbers, are hyaline, as are the sterigmata, and possess a rather conspicuous membrane; their form is more or less rounded to rectangular. The measurements are: conidia up to 4×2 μ, sterigmata as much as 20 μ long. The conidia gather in big numbers in the pycnidia from where they subsequently are discharged through the slightly protruding ostiolum.

The stroma is covered with an epidermislayer of dark-coloured hyphae; the interior is formed by a white mycelium where also the branching strands of dark-coloured hyphae — as in *Cyttaria* — are present; the whole construction resembles indeed very much a diminutive Cyttaria-stroma.

Mmes Bommer & Rousseau (3) have described a species of *Podocrea* Sacc. from Patagonia which they call *P. deformans,* causing as it were „une tumeur ligneuse" on branches of *Fagus (Nothofagus) antarctica.* From their paper I translate the following description:

„The brown yellow stroma (8×3 mm) looks like an upright clubshaped *Clavaria* where the pycnidia (the authors speak of perithecia) are immersed in the upper part of the stroma and measure 210—280 μ; their hyaline ellipsoidic conidia ($3—4{,}5 \leqslant 3$ μ) develop from short (10—24 μ) sterigmata".

The mycelium of the fungus causes, as mentioned above, a lignose tumor, where the elements of wood and bark are highly hypertrophied. The parenchymatic tissue is extensively developed, and filled with starch; on the other hand, the tracheids are reduced to the dimensions of the parenchymatous cells.

From this description and the illustrations given, it is plainly evident that the *Podocrea deformans* of Bommer & Rousseau strikingly resembles our pycnidial stroma described above.

That it cannot remain in the genus *Podocrea* is clear, a. o. from the absence of asci in the so called perithecia, though the possibility that the fungus might be a pycnidial form of a *Podocrea* on *Nothofagus* cannot be entirely dismissed. The absence of perithecia suggests in both cases that we may have to do either with a *Cyttaria*[1]) in a still undeveloped condition, or with a conidial stage of the fungus, the habitus as well as habitat of which suggest a relationship to the genus *Cyttaria.*

[1]) Spegazzini (14, p. 22) is of opinion that the *Podocrea* in question must be regarded as synonymous with *Cyttaria Hookeri* Berk.; he offers, however, no reason for this bare statement.

It cannot be denied that our specimens may represent immature fruiting bodies of a *Cyttaria*. Young stromata of *C. Darwini* and *C. intermedia* show a full development of spermogonia before perithecia are more than initiated. It is moreover not impossible that the substratum — very young branches — does not permit of full development.

Further there is the striking similarity in general habitus between our fungus which I have named *Cyttariella* and f. i. *Cyttaria intermedia* Palm: the distribution of pycnidia in the former is identical with the arrangement of perithecia in the latter. The somewhat fleshy consistency of the pycnid stroma, as far as this can be made out on dried (and boiled) material, is another point of resemblance with the perithecial stroma of a *Cyttaria*.

On the other hand, there is evidence in favour of the second suggestion that the pycnid stromata belong as a highly developed, purely condial stage in the life cycle oft the Cyttarias.

Thus the colouring of the stromata in question differs — in the one case being dark brown, in the other dark yellow — in a marked way from that of the known perithecial stromata in *Cyttaria*.

Further, the Cyttariella-stromata attack, as far as known, only younger twigs and branches of its hostplant which they deform more or less. The deformation caused by *Podocrea deformans* of Bommer et Rousseau on the younger branches of *N. antarctica* very much resembles, morphologically as well as anatomically, the deformations on older branches of the same beech species, induced by *Cyttaria Darwini* (Bommer & Rousseau, 3, 57 pl. I fig. 1—5; Pl. II fig. 6; Pl. III fig. 20; Pl. IV fig. 22). This similarity in respect to the fungus-attack may of course be a specific reaction on the part of the hostplant, but just as well it may indicate that different fruitforms of one and the same fungus are responsible for the formation of the tumors in question.

Important differences between these Cyttariella-stromata and the young „spermogonia" (thus pycnidia) bearing stromata of *Cyttaria* are, as far as this can be traced on the material at hand, to be found in the shape of the pycnidia. The spermogonia in *Cyttaria Hookeri* and *C. intermedia* seem to possess no elaborate or differentiated ostiolum; the spermogonia do not emerge above the surface of the stroma. Even in those *Cyttarias*, as f. i. in *C. Darwini* where the basal spermogonia are more wart-like and thus rise above the surface of the stroma, the ostiolum is in no way more differentiated. A very distinct ostiolum, however, is met with in *Cyttariella deformans* (Bomm. et Rouss.) Palm as well as in *C. Skottsbergii* Palm.

This circumstance may thus lead to the conclusion that the pycnid stromata just referred to are really distinct from the perithecia-bearing stromata. Until more definite information is at hand regarding the life history of our pycnid stroma on *N. betuloides* and of *„Podocrea defor-*

mans" Bomm. et Rouss., it seems most convenient to create for the fungi in question a new genus, *Cyttariella*. The new genus would thus contain two species, the form collected by Skottsberg for which I propose the name of *C. Skottsbergii* n. sp., and *C. deformans* (Bomm. et Rouss.) comb. nov.

Cyttariella nov. gen.

In ramulis Nothofagorum parasitica; stromata e tumoribus prorumpentia, pyriformia sive clavariiformia, colore externo luteo vel fusco, interno albido; pycnidia in parte superiore stromatis paulum immersa ostiolo prominulo ornato, hymenio conidifero pulverulento, sterigmatibus conidiisque hyalinis.

Area distrib.: America meridionalis (Patagonia, Fuegia).

C. Skottsbergii n. sp. Stromate e pyriformi 3—4 mm longo, 2—3 mm crasso, nigrofusco intus albido plerumque secus lineas duas parallelas in ramulis deformatis erumpente; pycnidiis 10—25, in parte applanata superiore stromatis superficialiter immersis 200—300 μ, ostiolum distincte protractum obtusum exhibentibus; hymenio conidifero pulverulente, conidiis hyalinis ellipsoideis 3—4 × 2 μ, sterigmatibus 20 μ longis.

Hab. in *Nothofago betuloide* (Mirb.) Blume in Fuegia; prope Ushuaia, ad flum. Rio Olivia, leg C. Skottsberg.

The difference between *C. Skottsbergii* and *C. deformans* consist mainly in the distribution of the pycnidia which are found practically all over the stroma in the latter, further in the size and colour of the stroma.

If it be admitted that species of *Cyttariella* belong as a conidial fructification to a certain species of *Cyttaria,* the life history of *Cyttaria* might tentatively be reconstructed as follows. The Cyttaria-stroma having generally ceased development during the winter, the ripe ascospores are dispersed. When the beginning of the new growth of the evergreen *Nothofagus* sets in, the ascospores may infect f. i. the opening buds or other growing parts of the hostplant. From the point of infection a mycelium develops which, as the attacked branches grow, causes smaller (by *Cyttariella Skottsbergii*) or bigger (by *C. deformans*) deformations of the host plant. The purely conidial stage, the Cytariella-stroma, develops from the mycelium of these more or less deformed woody branches. With the advancing age of the tumor and the disappearance of the conidial fructification, favourable conditions for the development of the perithecia-bearing stromata (*Cyttaria*) are created. From the figures of Bommer and Rousseau of the anatomy of the deformations it is to be seen that a beech-shoot has been invaded in some way or other by the mycelium, causing deformation during nine consecutive years before the crop of Cyttaria-stromata appears.

7. Systematical position of Cyttaria.

Regarding the systematical position of *Cyttaria* the opinions of most authors who have occupied themselves with this genus, diverge widely. Some of the reasons for this have already been stated in the introduction. Thus Berkeley, the author of the genus *Cyttaria,* regards it as very closely related to the genus *Bulgaria* Fr. Spegazzini, on the other hand, declines to bring it in any connection with the order of the *Discomycetes.* Hariot suggests to place it near the *Hypocreaceae.* Fischer would prefer to place *Cyttaria* in the neighborhood of the genus *Cenangium,* though a certain relationship, according to him, can be traced with the genus *Hydnocystis.* Schroeter has created for the genus *Cyttaria* a special family, *Cyttariaceae* which, according to him, should be ranged near the *Pezizineae.* v. Wettstein again in his system places the *Cyttariaceae* between the *Helvellaceae* and the *Rhizinaceae.*

Now *Cyttariella* must certainly be of a certain importance in connection with the systematical position of the genus *Cyttaria.* The two species of *Cyttariella* described here, recall habitually in a striking way members of the order of the *Sphaeriales.*

As already set forth above, this resemblance has been strong enough to induce Mmes Bommer and Rousseau to describe — in the absence of perithecia and asci — our *Cyttariella deformans* with its somewhat vividly coloured stroma as a *Podocrea.*

In this connection the big, brightly coloured stromata of some South American *Hypocreales,* belonging to the genera *Ascopolyporus* Moell. and *Mycocitrus* Moell. which at least habitually show a remarkable similarity to *Cyttaria,* certainly present themselves for comparison. The resemblance might of course be regarded as a purely superficial one, without any bearing on the relationship. On the other hand, it might offer a suggestion worth while to follow up closely, when adequate Cyttaria-material is available for research. As far as I have been able to gather from the literature at my disposal, the development of the perithecia of *Cyttaria* does not exactly seem to oppose a connection with parasitic types of the order *Sphaeriales.* The parasitism of the members of *Cyttariaceae* may in this way be more readily explained; till now, as seen above, the family in question has mostly been associated with non-parasitical fungi.

The Cyttaria-material in the collections of Skottsberg and Borge is preserved in the Riksmuseum and in the Botanical Institute of the University of Stockholm (Sweden) respectively.

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Biological notes on Albugo.

By B. T. Palm.

Internal pustules.

The parasitic mycelium in *Albugo* (or *Cystopus*) is either strictly localized to certain organs — then generally to leaves — as in *A. Portulacae,* or more or less systemic; examples of the latter range from *A. candida* to *A. Tragopogonis.* As is well known, the host of the latter species may be completely invaded by the parasite which oftentimes causes considerable deformation. The attacked host plant is able to produce flowers and perhaps seeds. The conidial pustules are found on all aerial parts of the host as well as on the bracts of the flower heads.

It is of interest to note that conidia are produced in parts of the Tragopogon-flowers where an outside inspection would fail to reveal their presence. The mycelium of the fungus travels in the center of the flower axis and from there spreads out into the central tissue of the broadened capitulum. As in other parts of the host the mycelium is intercellular, sending rather minute, relatively thickwalled, knobshaped haustoria into the host cells; the same type of haustorium was pictured already by De Bary (1887) for *Albugo candida.* The tissue below the flowers shows a spongiose texture, composed as it is of rather large, rounded cell-elements, separated by wide air-filled spaces. On longitudinal microtome sections through this lacunose tissue conidia in large numbers are often found scattered throughout the intercellular spaces. It was first thought that they might have been brought there, when the flower-heads were trimmed prior to fixation, but an inspection of about twenty heads showed them to be present also in those parts of the capitulum that had not been touched during the preparation. When, finally, young conidia were found still attached to conidiophores which in their turn could be traced to a mycelium, sending haustoria into intact host cells, it was proven that these conidia had originated „in situ". Fig. 1 shows a longitudinal section through such an internal „pustule". The conidia are seen scattered irregularly in the intercellular spaces; there is no regular arrangement of conidiophores, as in superficial pustules. Individual conidiophores are apparently produced directly from the intercellular mycelium in places, where intercellular space provides favorable air — and moisture — conditions. Some of the conidia at least would seem to have attained a normal development in spite of their peculiar location within the tissue of the host plant. They also showed indications of incipient germination; in many of them the protoplast had already been segmented into the final uninucleated parts as described for instance by

Harter and Weimer (1929, p. 55) for *Albugo Ipomoeae-panduranae*. Empty conidia were not met with in my material, and germination stages were not seen; it is doubtful, if actual germination takes place. It does not appear likely, that these conidia would be of much importance in the distribution of the fungus, even if they do germinate. The formation of spore-producing bodies internally instead of as normally, on the surface of the host plant, has been recorded for many rusts (Miss Rice 1924). From the capitulum the mycelium invades the individual flowers, passing through the base of the achenes. Spreading upwards, it emerges again on the surface of the achene. Pustules are formed not only on the outside of this organ as could be expected, but also in the open cylindrical space on its inside, where microtome sections showed well developed clusters of conidiophores with conidia still adherent (fig. 2). These interior pustules are of a much smaller size than those on leaves or stems of the same host plant. The conidia formed appear to have, as far as can be judged from fixed material, a perfectly normal cell content. If and when these conidia eventually germinate could not be investigated. It must thus at present remain doubtful, if these conidia could play a role in the infection of for instance the embryo, when it is emerging from the seed after overwintering.

Not only conidia but also oöspores are sometimes produced in the flower regions. They have been found in the capitulum-tissue, in the young seed coat and — in one instance (fig. 2) — in the micropylar part of the integument.

The presence of *Albugo*-conidia on and in the fruit of the Tragopogon-host recalls a similar occurrence of *Puccinia glumarum* on wheat and rye kernels (see Arthur 1930, p. 333). The rust pustules on the kernels do not seem to aid in the dissemination of this rust disease. The same probably also holds for the conidia and oospores produced in the seed, of the host by *A. Tragopogonis;* germination tests will be needed to settle the question of their eventual importance in effecting a spread of the disease.

Germination of conidia.

There seems to exist a remarkable lack of agreement between pathologists regarding the prevalent mode of germination of the conidia in *Albugo*. If recent handbooks are consulted, conflicting statements are met with; a selection made at random of such statements will show that opinions vary greatly.

There seems at present to be a general tendency to regard germination by a germ tube as more or less accidental, the ordinary mode supposedly being by direct formation of zoospores. This is the more peculiar as the older literature, summarized in older mycological floras, explicitly states, that in a number of species germination by a tube is by no means an exception. It will suffice here to give the following citations.

Riehm (1928, p. 383) writes in the last edition of Sorauer's Hand-

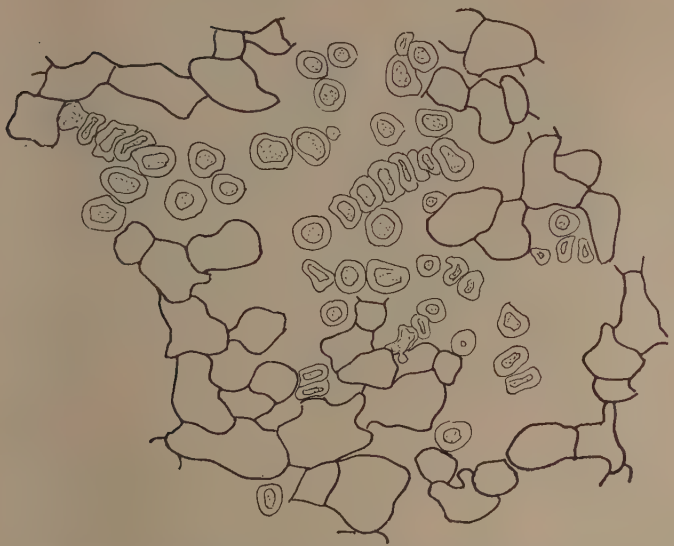

Fig. 1. Longitudinal section through capitulum of *Tragopogon pratense*, with internal spores of *Albugo tragopogonis*. (Drawing somewhat schematical.)

Fig. 2. Section through basal part of achene of *Tragopogon pratense*, showing conidia and mycelium of *Albugo tragopogonis* between wall of achene and ovulum; young oospore in the micropyle of the ovulum. (Drawing somewhat schematical.)

buch der Pflanzenkrankheiten: „Die Weiterentwicklung der Konidien erfolgt selten durch Keimschlauch, sondern in den meisten Fällen durch Zerteilung des Inhaltes zu Zoosporen." Gwynne-Vaughan and Barnes (1927, p. 102) seem to hold a similar opinion: „In the presence of water, a few biciliate zoospores are set free from the sporangia, but when conditions are relatively dry, germ tubes are produced." On the other hand, Heald (1926, p. 392) is of the opinion that „the conidium never germinates by the production of a hypha or germ tube but becomes a zoosporangium". Gäumann-Dodge (1928, p. 80) state that „In ..... Albugo the mature zoospores swarm directly out of the conidium. In other forms, the formation of swarmspores is suppressed and replaced by the direct development of conidia to a mycelium." In his handbook on the lower fungi Fitzpatrick (1930, p. 187) summarily expresses a similar opinion: „The zoosporangium germinates by means of swarmspores."

It is difficult to understand what could have caused this apparent diversity of opinion. To my knowledge there have been published no additional data which would invalidate the older work. Possibly Melhus' (1911) extensive and careful study of the conidial germination in *Albugo candida* might be held responsible for the gradual change of opinion in this matter. As is well known, Melhus showed that in this species germination by swarmspores invariably took place, while previous workers with the same species, Tulasne and Hoffmann (cited after Melhus 1911), had as consistently seen germination by tubes. For *Albugo ipomoeae-panduranae* Harter and Weimer (1929) describe and figure both modes of germination.

My attention was called to the discrepancies outlined above during a study of several tropical species of Albugo for taxonomical purposes. When sectioning conidia-bearing leaf pustules of *Albugo Portulacae* (collected by the present writer at Tiquisate, Pacific coast of Guatemala) it was found that a great number of conidia in a pustule had germinated „in situ". The whole pustule consisted of a tangled mass of conidiophores and conidia with their germination tubes. Not only was this condition prevalent in pustules that apparently had been producing conidial chains for some time, but also in pustules, where the epidermis of the hostleaf had not yet been ruptured by the pressure of the conidia. A rough estimate showed that over 50 % of the conidia had already sent out germtubes of varying lengths. It was thought at first, that the high temperature, combined with the high humidity of the air on the coastal plain of Guatemala, where the material had been collected, could have been responsible for the type of germination observed. A subsequent study of fresh material gathered at Guatemala City in the same country at higher altitudes (5000 f. above sealevel) during the dry season, gave, however, identical results. Germination by a germtube had long ago been described

for *A. Portulacae.* Apparently the fact that the conidia could germinate, before they have been distributed, had not been recorded.

These findings lead to a study of herbar material of a few species of Albugo. It was undertaken eventually to record germination by a tube in additional species. Herbar material proved to be quite as useful in this respect as fresh material, with the obvious limitation that it could give safe positive results only for those cases where germination had taken place by a tube. With a scalpel conidia were scraped from unopened as well as older pustules and boiled on a slide in 10 % lactic acid. The following two species yielded positive results:

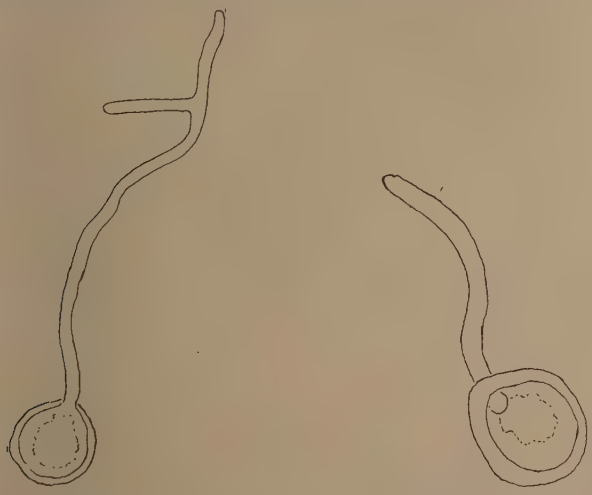

Fig. 3. *a* Germinating conidium of *Albugo Bliti.* — *b* Idem of *Albugo spinulosa.*

Albugo Bliti on *Atriplex retroflexus* (no. 4301, Fungi Columbiani from Rockvale, Mont., Aug. 1912);

Albugo spinulosa on *Cirsium arvense* (no. 2640, Fungi Gallici exs. C. Roumeguère from Bruxelles, Belgium, Aug. 1883).

Text figs. 3 a, 3 b were drawn from the above mentioned material, taken from unopened pustules. It is thus clear that the conidia in *Albugo* may germinate by a tube more often than is thought at present. Little exact information is available regarding the conditions which bring about germination as well as of those which are needed to cause the formation of a germtube resp. of swarmspores. The mode of germination might be a genotypic character in a certain clone of a species of *Albugo;* the conflicting results attained by Tulasne and Hoffmann on the one hand and by Melhus on the other contribute to make such a suggestion plausible for at least *Albugo candida,* the species studied by them. That such

clones may have a distinct geographical distribution is also indicated by the different behavior of *Albugo candida* in Europe and in this country. Environmental conditions may on the other hand be responsible for the occurrence of the one or the other mode of germination for *A. candida* and other species. Thus germination of conidia in young pustules under an unruptured epidermis might indicate that moisture — or oxygen — relations possibly might be factors in inducing a certain mode of germination. While very little is known in this respect, it can not be assumed that for instance exposure to a chilling temperature — as has been shown by Melhus for *A. candida* — would be necessary for germination in other species. The frequent instances of germination found in *A. Portulacae* under typically tropical conditions tend to show, that at least for that species another factor or combination of factors may influence germination.

Summary.

Internal production of conidia-bearing pustules was observed in *Albugo Tragopogonis* on *Tragopogon pratense*. Conidia of Albugo-species often germinate „in situ", sometimes before the pustules have ruptured the epidermis of the host leaf.

Conidial germination by a germtube is shown to occur in *A. Portulacae, A. Bliti,* and *A. spinulosa.*

Herbar material might be used with advantage for the study of conidial germination.

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Neue Flechten. — XI.

Von Dr. A. Zahlbruckner.

170. **Thrombium cercosporum** n. sp.

Thallus epilithicus, crustaceus, uniformis, tenuissimus, substrato adhaerens, subtartareus, modice expansus, argillaceus, opacus, KHO flavosordidescens, $CaCl_2O_2$—, continuus, subgranulosus vel granuloso-inaequalis, soredиis et isidiis non instructus, in margine linea nigra non cinctus, gonidiis cystococcoideis, globosis, viridibus, 7—9 μ latis. Apothecia plus minus dispersa, adpresse sessilia, nigra, nitidula, exigua, ad 0,1 mm lata, convexa, a thallo libera, poro haud conspicuo; expiculum dimidiatum, fuligineum, mediocre, semiglobosum; nucleus decolor, purus, demum dilute et sordide lutescens, J flavens; paraphyses capillari-filiformes, strictae, simplices vel increbre ramosae, eseptatae, contextae et persistentes; asci oblongo-clavati, superne rotundati et membrana modice incrassata cincti, 8 spori; sporae 2—3 seriales, decolores, simplices, fusiformes, apicibus angustato-rotundatis, rectae, membrana tenui cinctae, halone non circumdatae, contentu aequaliter oleoso, J —, 18—21 μ longae et 5,5—6,5 μ latae.

Tibet: in regione fontium lacus Sarigh Jilganing Kul, 5250 m. s. m., ad saxa calcarea (Trinkler).

171. **Pyrenula** (sect. **Eupyrenula) pudica** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, effusus, tenuis, 0,1—0,12 mm crassus, subchondroideus, substrato arcte adnatus, stramineo-albidus, opacus, KHO e lateritio demum sanguineus, $CaCl_2O_2$—, continuus vel passim parce et irregulariter rimosus, pro parte subleproso-adspersus, maculis albidis minutis, parum conspicuis obsitus, soredиis et isidiis destitutus, in margine linea nigricante non cinctus et minus clare determinatus; stratum corticale angustum, ex hyphis dense intricatis formatum; gonidia ad Trentepohliam pertinentia; hyphae thalli non amyloideae. Apothecia immersa et persistenter thallino-vestita, verruculas convexas, sensim in thallum abeuntes formantia, plus minus approximata, 0,5—1 mm lata, thallo concoloria, ad verticem leviter griseo-obscurata, poro angustissimo, haud conspicuo; excipulum subglobosum, 0,3—0,35 mm latum, fuligineum, 9—18 μ crassum, undique aeque crassum, cum basi in substratum penetrans; nucleus decolor et purus, J lutescens; paraphyses capillari-filiformes, strictae, simplices, laxae; asci subcylindrici vel cylindrico-oblongi, 8 spori; sporae uni-biseriales, fuscidulae, ovales, in uno apice rotundatae, in altero plus minus acutatae, 4 loculares, loculis subaequalibus, mediis subangulosis, halone non circumdatae, 21—27 μ longae et 9—11 μ latae. Pycnoconidia non visa.

Insula Hawaiiensis Kaui: ad Robinsons Sommer House, c. 1000 m. s. m., ad corticem arboris (Faurie no. 327).

172. **Pyrenula** (sect. **Eupyrenula) Rockii** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, effusus, crassiusculus, subchondroideus, pallide alutaceus, oleoso-nitidulus, KHO e flavente subaurantiacus vel lateritius et demum ferruginascens, continuus vel irregulariter fissus, laevis, epunctulatus, sorediis et isidiis nullis, hypothallo distincto destitutus; stratum corticale 80—120 μ crassum, ex hyphis tenuibus, densis et intricatis, conglutinatis formatum, decolor; gonidia ad Trentepohliam pertinentia, infra corticem stratum continuum formantia; medulla alba, J—. Apothecia immersa, verrucas 0,8—1,2 mm latas, convexas, a thallo corticato tectas formantia, ostiolo sat lato et nucleum albidum aperiente instructa; excipulum integrum, globosum, fuligineum, 16—19 μ crassum et circa ostiolum parum incrassatum; nucleus decolor, purus, J vinose rubens (imprimis asci); paraphyses filiformes, simplices, eseptatae, ad apicem non latiores, subliberae; asci ovali-clavati, mox confluentes, 8 spori; sporae 2—3 seriales, e decolore fuscescentes et mox obscuratae, ellipsoideae, utrinque bene rotundatae, subrectae vel curvulae, 4 loculares, loculis angulosis et subaequalibus, amplae, 60—80 μ longae et 21—27 μ latae. Pycnoconidia non visa.

Insula Hawaii: in monte Mauna Loa, ad corticem Sapindi (J. Rock).

173. **Parmentaria Rappii** n. sp.

Thallus crustaceus, uniformis, epi- et endophloeodes, expansus, substrato adnatus, glaucescenti-flavus, nitidulus, KHO demum sanguineus, $CaCl_2O_2$—, laevigatus, continuus, sorediis et isidiis nullis, in margine hypothallo nigro, latiusculo cinctus, superne strato corticali subdecolore, plectenchymatico obductus; gonidia ad Trentepohliam pertinentia. Stromata dispersa vel approximata, rotunda, vulgo plus minus irregularia, convexa, 2,5—4 mm lata, ad basin constricta, passim gibbosa, cum thallo concoloria, strato corticali obducta, intus pallida, subcarnea, excipula plura, obliqua vel subobliqua, hinc inde superposita, in collum commune abeuntia, ostiolo communi primum punctiformi, demum dilatato, excipulum fuligineum, mediocre; nucleus decolor, purus, J lutescens; paraphyses capillari-filiformes, ramosae, eseptatae; asci oblongo-clavati, superne rotundati, 8 spori; sporae subuniseriales, demum olivaceo-fuscae, ellipsoideae vel subovales, utrinque rotundatae, rectae vel rectiusculae, murales, luminibus cellularum rotundis, dilutioribus et transparentibus, cellulis in seriebus superpositis 8, in seriebus horizontalibus 1—3, 32—51 μ longae et 14,7—15 μ latae.

Florida: Sanford, ad corticem Celtidis mississippinensis (S. Rapp no. 5 pr. p.).

174. **Melanotheca cinerata** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, expansus, substrato arcte adpressus, tenuis, ad 0,1 mm crassus, cinereus, opacus, KHO e flavo aurantiacus vel lateritius, continuus, laevigatus, sorediis et isidiis destitutus, in margine linea tenui nigra cinctus; stratum corticale subchondroideum, ex hyphis plus minus

longitudinalibus et gelatinose contextis formatum, 35—37 μ crassum; gonidia ad Trentepohliam pertinentia. Stromata crebra, cum thallo concoloria, vulgo approximata, rotundata vel elongata, rarius irregularia, convexa, rare monovulgo pluri (— 12) carpica, verticibus excipulorum nigris, nitidis, demum usque 0,6 mm latis, convexis, poro tenuissimo pertusa, strato corticali obducta, intus pallida, gonidia nulla includentia; excipulum fuligineum, crassum, aeque fere latum, tantum ad latera parum crassius, poro terminali et recto, excipula passim confluentia; nucleus decolor, purus, subgelatinosus, J lutescenti-fulvescens; paraphyses capillares, sat densae, increbre ramosae, eseptatae; asci oblongo- vel ellipsoideo-clavati, 8 spori; sporae subbiseriales, olivaceo-fuscae, demum corrugatae et magis obscuratae, oblongae vel ellipsoideo-oblongae, utrinque rotundatae, rectae, 8 loculares, loculis hind inde centralibus semel vel bis biocellatis, rotundatis vel late lentiformibus, 38—50 μ longae et 11,8—14,9 μ crassae. Conceptacula pycnoconidiorum punctiformia, nigra, perifulcrio dimidiato nigro; fulcra exoboridialia; pycnoconidia capillaria et arcuata, 23—24 μ longa. — Species thallo cinereo distincta.

Florida: Sanford, ad corticem Celtidis mississippinensis (S. Rapp no. 5 pr. p.).

175. **Trypethelium** (sect. **Eutrypethelium**) **leprosulum** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, late expansus, tenuis, ad 0,1 mm crassus, substratum arcte obducens, cervino- vel fuscescenti-cinereus subviridulusve, opacus, KHO vix mutatus, $CaCl_2O_2$—, subleprosus vel subpulverulentus, continuus, soredиis et isidiis nullis, in margine linea obscuriore non cinctus; gonidia ad Trentepohliam pertinentia. Stromata sat crebra, plus minus approximata, cum thallo concoloria et in superficie subleproso-pulverulenta, heteromorpha, rotundata, oblongata vel subirregularia, sessilia, convexa vel fere semiglobosa, ad basin parum constricta, 1—4 mm longa et ad 1 mm alta, excipula plura (usque 12) includentia, intus obscura, ostiolis punctiformibus, parum conspicuis, nigris, stromata aequantibus; excipulum fuligineum, KHO in purpureum vergens, ovale vel ellipsoideo-ovale, rectum, poro terminali pertusa; nucleus decolor, gelatinosus, purus, J flavescens; paraphyses capillari-filiformes, laxiuscule ramosae et gelatinam percurrentes; asci ellipsoideo-clavati, 8 spori; sporae 2—3 seriales, decolores, fusiformes vel subdigitiformes, ad apices angustato-rotundatae, rectae vel subrectae, 8—10 loculares, loculis subcubico-globosis, halone non circumdatae, 40—50 μ longae et 6—8 μ latae.

China, prov. Fukien: Kulang prope Fudschou, in silvis ad corticem arborum (Chung no. 371 et 376).

176. **Graphis** (sect. **Solenographa**) **spodoplaca** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, substrato arcte adhaerrens, maculatim expansus, tenuis, vix 0,1 mm crassus, cinereus, opacus, KHO demum sordide sanguineus, $CaCl_2O_2$—, continuus, laevigatus vel paululum pulverulentus, soredиis et isidiis nullis, in margine linea tenui nigraque utplurimum cinctus; stratum corticale angustum, plectenchymaticum et parum bene limitatum, non chondroideum; gonidia ad Trentepohliam pertinentia. Apothecia

lirellina, adpressa, plus minus dispersa, simplicia, rare ramo unico subpatente aucta, usque 5 mm longa et 0,1—0,15 mm lata, varie flexuosa, undulata vel arcuata, apicibus obtusatis vel acutatis, extus usque ad verticem anguste thallino-vestita; discus rimiformis, niger, epruinosus; excipulum fuligineum, integrum, crassiusculum superne, infra hymenium angustius, labiis integris, arcuato-rectis, superne acutis et conniventibus, usque ad verticem thallino-vestitum; nucleus in sectione transversali oblongo-ellipticus, decolor, dense et minute spumuloso-inspersus, 140—150 μ altus, J lutescens: paraphyses filiformes, densae, strictae, simplices, eseptatae, contextae; asci oblongo-clavati, 8 spori; sporae biseriales, decolores, subcylindrico-oblongae, utrinque rotundatae, rectae, 8 loculares, loculis lentiformibus, primum haloniatae, J violaceae, 20—23 μ longae et 5—6 μ latae.

China, prov. Fukien: Kuliang prope Fudschou, in silvis, 5—600 m. s. m. (Chung no. 596, f.).

In den Bestimmungsschlüssel, den ich für die chinesischen *Graphis*-Arten ausarbeitete[1]) wäre die neue Art in folgender Weise einzureihen.

α) — II. — 2.

β) Labia excipula mere integra.

* Exipulum inferne non retusatum; sporae 8 loculares, minores . . . . . *Gr. spodoplaca*

** Excipulum ad basin retusatum; sporae 12 loculares, majores . . . . . *G. Sapii*

177. **Graphis endophaea** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, late expansus, tenuis, ad 0,9 mm crassus, argenteo-glaucescens vel cinerascens, KHO—, $CaCl_2O_2$—, continuus, laevigatus, non isidiosus nec sorediosus, in margine linea obscuriore non cinctus; stratum corticale decolor, plectenchymaticum, subchondroideum, 15—17 μ crassum; gonidia ad Trentepohliam pertinentia, infra stratum corticale stratum continuum formantia. Apothecia lirellina, sessilia, sat crebra, simplicia vel pauciramosa, nigra, nitida, flexuosa vel arcuata, extus ad latera usque ad verticem thallino-vestita, 3—6 mm longa et ad 0,2 mm lata; excipulum integrum, fusco-olivaceum, striis angustis, nigris, verticalibus percursum, elongatum, ad basin retusum et breviter extrorsum anguloso-productum, labiis erectis, in parte superiore increbre crenatis- vel tuberculato-crenulatis supra hymenium incurvis, conniventibus et acutatis; hymenium in sectione transversali oblongo-cordatum, decolor, purum, 145—150 μ altum et in parte superiore 70—76 μ latum, J vix lutescens; hypothecium angustum, fuscescens; paraphyses filiformes, densae, simplices, eseptatae, gelatinose conglutinatae; asci oblongi-clavati, bispori (an semper?); sporae decolores, subcylindrico-oblongae, utrinque bene rotundatae, subrectae, ad ambitum parum undulatae, 10—12 loculares, loculis lentiformibus, 60—62 μ longae et 11—12 μ latae.

[1]) apud Handel-Mazzetti: Symbolae Sinicae. III. Teil, 1930, p. 39.

China, prov. Fukien: Kuschan prope Fudschou, ad corticem arborum (Chung no. 585).

Für den Bestimmungsschlüssel chinesischer Graphisarten:

a) — II. — 2. — 00.

* Excipulum mere fuligineum; thallus tenuior, quasi suffusus . . . . . *G. Chungii*

** Exipulum fusco-olivaceum et nigrostriatum; thallus crassior et strato corticali distincto obductus . . *G. endophaea*

178. **Graphis** (sect. **Solenographa**) **gonimica** n. sp.

Thallus epi- et endophloeodes, crustaceus, uniformis, expansus, substrato adhaerens, parum mollescens, tenuis, 0,06—0,07 mm crassus, virenti-cinereus vel virenti-glaucescens, opacus, KHO demum fulvo-sordidescens, $CaCl_2O_2$—, continuus, subpulverulentus, sorediis et isidiis non instructus, in margine linea nigra non cinctus; stratum corticale angustum, decolor, plectenchymaticum; hyphae ultimae in elementa substrati penetrantes; gonidia copiosa, maximam partem thalli occupantia, ad Trentepohliam pertinentia. Apothecia lirellina, gracilia, sat densa, adpressa, simplicia, subrecta vel arcuata, undulata, extus usque ad verticem anguste thallino-obducta, 1,5—3 mm longae et $\pm$ 0,1 mm lata, nigra, nitida; discus rimiformis, parum conspicuus; excipulum fuligineum, integrum, in parte inferiori valde incrassatum, longitudinem hymenii aequans, ad basin retusum et acutum, sed non productum, labiis erectis, subintegris, superne conniventibus; hymenium decolor, dense spumuloso-inspersum, J parum lutescens, in sectione transversale ellipticum, 90—100 μ altum; asci oblongo-clavati, 8 spori; sporae decolores, subcylindrico-oblongae vel fere digitiformes, utrinque rotundatae, rectae, 8 loculares, loculis lentiformibus, non halionatae, J violaceae, 22—32 μ longae et 5—9 μ latae. — Accedit ad *Graphidem Sapii* A. Zahlbr., ab eo thallo omnino alio, sporis 8 locularibus et minoribus differens; a *Graphide spodoplaca* A. Zahlbr. distat excipulo inferne valde incrassato et thallo alio.

China, prov. Fukien: Kuschan prope Fudschou, ad corticem ramorum arboris (Chung no. 591 a et 591 b).

179. **Phaeographina elaeoplaca** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, expansus, substratum arcte obducens, tenuis, vix 0,1 mm crassus, subchondroideus, olivaceus, passim olivaceo-glaucescens, nitidulus, KHO demum sanguineus, $CaCl_2O_2$—, continuus, laevis, sorediis et isidiis nullis, in ambitu linea tenui nigraque limitatus; stratum corticale decolor, 20—28 μ crassum, subchondroideum, ex hyphis intricatis et gelatinose conglutinatis formatum; gonidia ad Trentepohliam pertinentia, stratum continuum formantia. Apothecia lirellina, adpressa, nigra, opaca, simplicia, usque 6 mm longa et usque 0,3 mm lata, subrecta vel irregulariter flexuosa vel undulata, superne planata, usque ad verticem thallo obducta pallidiore; discus rimiformis; excipulum dimidiatum, fuligineum, semiglobosum, labiis ad basin latissimis, retusis, angulosis, sed non striatis, versus apicem sensim angustioribus, arcuatis; hymenium in sectione transversali subglobo-

sum, inferne linea tenui olivaceo-fusca limitatum, decolor, dense guttuloso-inspersum, J vix lutescens; paraphyses parum conspicuae, filiformes, simplices, eseptatae; asci oblongo-clavati, monospori; sporae fuscescentes, demum obscuratae, oblongae, utrinque bene rotundatae, rectae vel subrectae, murales, cellulis numerosis, subcubicis, halone non cinctae, J obscurato-violaceae, 110—120 μ longae et 30—32 μ latae. — Affinis est *Phaeographinae pluvisilvarum* A. Zahlbr., thallo olivaceo, KHO demum sanguineo, subchondroideo et structura excipuli discrepans.

China, prov. Fukien, prope Fudschou, ad corticem arboris (Chung no. 382, 399 c et 596 d).

180. **Phaeographina granulans** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, substratum arcte obducens, tenuis, ad 0,1 mm crassus, subtartareus, expansus, albido-cinerascens, opacus, KHO demum sanguineus, $CaCl_2O_2$—, continuus, granulis minutis, sat dispersis obsitus, sorediis et isidiis non instructus, in margine linea obscuriore non cinctus; stratum corticale angustum, plectenchymaticum, non chondroideum; gonidia ad Trentepohliam pertinentia. Apothecia lirellina, sessilia, simplicia, subrecta vel undulata, ad apices acutata vel rotundata, in ambitum subundulata, usque 6 mm longa et 0,3—0,4 mm lata, nigra, opaca, extus usque ad verticem thallino-vestita; discus rimiformis, impressus; excipulum fuligineum, dimidiatum, labiis arcuato-inflexis, integris, ad basin latissimis et ibidem subretusatis vel subrotundatis; hymenium superne fuscescens, caeterum decolor, guttulis oleosis majoribus et minoribus dense impletum, 230—250 μ altum, in sectione ± transversim ellipticum, J parum lutescens; paraphyses parum visibiles, filiformes, simplices; hypothecium angustum, subdecolor, dilute flavescens; asci ellipsoideo-oblongi, mono-vel bispori; sporae e fuscescente fuscae, oblongae vel subfusiformi-oblongae, ad apices rotundatae, subrectae vel curvulae, murales, cellulis numerosis, subcubicis, 140—160 μ longae et 29—31 μ latae, J —. Affinis *Phaeographinae phaeoplacae* A. Zahlbr., sed thallus aliter coloratus, non chondroideus et lirellis usque ad verticem bene thallino-vestitis.

China, prov. Fukien: Kuschan prope Fudschou, 5—600 m. s. m. (Chung no. 404).

181. **Phaeographina fukiensis** A. Zahlbr. apud. Hand.-Mazzett., Symbol. Sinic., III. Teil, 1930, p. 62.

var. **substriata** A. Zahlbr. nov. var.

A typo differt excipulo vittato et sporis parum minoribus.

Excipulum molle, crassiusculum, in parte superiore cinerascens, in parte inferiore olivaceo-fuscescens, striis tenuibus, increbris, erecto-subradiantibus irregulariter percursum, extus a thallo corticato obductum; sporae oblongae, rarius subovales, rectae vel subrectae, ad apices rotundatae, murales, cellulis numerosis, in seriebus superpositis 10—12, in seriebus horizontalibus 1—3, 32—36 μ longae et 11,5—12 μ latae.

China, prov. Kushan: prope Fudschou, 5—600 m. s. m., in silvis corticola (Chung no. 597 pr. p.).

Der Bestimmungsschlüssel für die chinesischen *Phaeographinen* ist jetzt umzuändern, u. zw.:

B. Apothecia lirellina
I. Excipulum fuligineum
1. Excipulum dimidiatum
α) Thallus olivaceus; sporae J violascentes, minores, 110—120 μ longae . . . . . *Ph. elaeoplaca*
β) Thallus non olivaceus; sporae J —
* Thallus albido-cinerascens, non chondroideus, granulosus, KHO demum sanguineus; sporae 145—165 ⩽ 30—33 μ . . *Ph. pluvisilvarum*
** Thallus argillaceo-glaucescens, chondroideus, laevigatus, non granulosus; sporae 140—160 ⩽ 29—31 μ . . . . . *Ph. granulans*

182. **Phaeographis** (sect. **Platygramma**) **submaculata** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, late expansus, tenuis, vix 0,1 mm crassus, substratum arcte obducens, subtartareus, partim olivaceo-fuscescens, partim, praesertim circa apothecia, albido-cinerascens, opacus, KHO e flavo aurantiaco-fulvescens et demum sordide sanguineus, $CaCl_2O_2$—, laevigatus, sorediis et isidiis nullis, in margine passim linea tenui nigricante cinctus; gonidia ad Trentepohliam pertinentia. Apothecia lirellina, sat crebra, adpressa vel emergentia, variabilia, simplicia vel irregulariter et laxiuscule ramosa, ramis brevibus vel elongatis, flexuosa vel arcuata, ad apices vulgo acutata; discus planus, usque 0,2 mm latus, nigrescens, madefactus fusco-nigricans, caesio-pruinosulus, margine albido usque ad verticem cinctus; excipulum integrum, obscure rufo-fuscum, sat tenue, aeque latum, non fragile, labiis integris, semipatentibus, extus a thallo obductis; hypothecium mediocre, decolor, bene limitatum et distinctum; hymenium superne anguste fuscescens, caeterum decolor, purum, gelatinam sat copiosam continens, J haud coloratum; paraphyses filiformes, strictae, densae, simplices, eseptatae, ad apices leviter clavulatae; asci oblongo-clavati, superne bene rotundati, 8 spori; sporae 3 seriales, fumoso-fuscae, demum obscuratae, oblongae vel subdigitiformes, ad apices utrinque bene rotundatae, 6—8 loculares, loculis primum lentiformibus, demum depressis, 26,5—31 μ longae et 6—7 μ latae. — A *Phaeographide dendritica* (Ach.) Müll. Arg. praesertim hymenio puro et sporis minoribus differt.

China, prov. Fukien: Kuliang prope Fudschou, ad corticem arboris (C h u n g no. 596 c).

183. **C h a u d h u r i a** nov. gen.

Thallus foliaceus, iteratim laciniatus, decumbens, non stipitatus, stratosus, superne et inferne corticatus, c o r t i c e p l e c t e n c h y m a t i c o, medullam amplam et gonidia ad P o l y c o c c u m pertinentia includens, subtus non venosus, rhizinis increbris instructus, cyphellis et pseudocyphellis destitutus. Apothecia p a r m e l o i d e a, superficialia; paraphyses simplices; asci 8 spori; sporae f u s c a e, p l a c o d i n a e. Pycnoconidia abhuc ignota.

Chaudhuria indica n. sp.

Thallus foliaceus et dense laciniatus, subcarnoso-membranaceus, cinerascenti-pomaceus, opacus, KHO—, $CaCl_2O_3$—; laciniae marginales increbre digitato-divisae, lacinulis ad 1 mm latis, ad apicem late rotundatis vel emarginatis, ad marginem subcrenulatis vel integris, planiusculis, superne nudis; laciniae centrales continuae; subtus pallidus, subcarneus, increbre rhizinosus; soredia et isidia desunt; utrinque corticatus. Cortex superior subdecolor, J violaceo-coeruleus, non inspersus, subchondroideus, plectenchymaticus, 54—66 μ crassus; cortex paginae inferioris similis, tantum paulum angustior; stratum gonidiale infra corticem paginae superioris thalli situm, angustum, subcontinuum, gonidiis globosis, sordide aeruginosis, glomeratis, 3—4 μ latis, membrana pertenui cinctis, ad Polycoccum pertinentibus; medulla alba, KHO—, $CaCl_2O_2$—, J—, lata, maximum partem thalli occupans, ex hyphis formata ramosis, ad 3 μ crassis, non inspersis; rhizinae sparsae, usque 3,5 mm longae, subdecolores, simplices, superne 90—120 μ crassis, ex hyphis tenuibus, verticalibus, eseptatis, dense conglutinatis formatae. Apothecia parmeloidea, alte sessilia, subpedicellata, crebra, superficialia, usque 2 mm lata; receptaculum extus laeve; margo thallinus cum thallo concolor, primum integer, crassiusculus, obtusatus, demum inaequaliter verrucoso-crenatus, crenis inflexis; discus castaneo-fuscus, opacus, ex urceolato concavus, epruinosus; receptaculum usque ad verticem corticatum, cortici thalli similiter formato, subcartilagineo, decolore, tantum ad ambitum anguste obscuratum, medullam amplam, stratum gonidiale et infra corticem et infra hymenium includens; excipulum internum angustum, integrum, decolor, J—; hymenium superne fuscum, non pulverulentum, caeterum decolor, purum, dilucidum, 180—210 μ altum, J coeruleum; paraphyses filiformes, strictae, simplices, eseptatae, ad apicem capitatae et obscuratae, conglutinatae; asci oblongo-clavati, ad apicem rotundati, 8 spori; sporae in ascis superne bi-, inferne uniseriales, fuscidulae et demum fumoso-fuscae, ovales vel ellipsoideae, ad apices latiuscule, rarius angustato-rotundatae, rectae, placodinae, biloculares luminibus cellularum rotundatis vel subtriangularibus, sat parvulis, septo crassiusculo et obscuro, isthmo tenui, parum conspicuo junctis, in medio non constrictae, 29—31 μ longae et 14,5—15 μ latae. Pycnoconidia non visa.

India orientalis: Darjeeling, 7500′, supra muscos saxa obtegens (G. L. Chopra. — Chaudhuri, Lich. Indiae Orient. no. 44).

Die neue Gattung wird sich aus der gegebenen Beschreibung mit Leichtigkeit sicher erkennen lassen. Schwieriger ist es, ihren phylogenetischen Anschluß zu ermitteln und sie in dem Flechtensystem unterzubringen.

Als Laubflechte mit Cyanophyceengonidien können für ihre Verwandtschaft nur die Stictaceen und Peltigeraceen herangezogen werden. Letztere scheiden wegen ihrer gehäuselosen Apothezien aus. Bleiben nur die Stictaceen übrig. Diese umfassen zwei Gattungen: *Lobaria* und *Sticta*, beide mit einem sehr einheitlich gebildeten und charakteristischen pyknokonidialen Apparat. Für die neue Gattung ist dieser bisher unbekannt und das ist

Chaudhuria indica Zahlbr.
1 Habitus, etwas vergr. *2* Schnitt durch ein Apothecium. Vergr. *3* Sporen. Vergr.
Gez. von Dr. K. Redinger.

der Umstand, der die Zuweisung der Gattung *Chaudhuria* in die Familie der Stictaceen erschwert, um so mehr als ein anderes Merkmal, welches im anatomischen Bau des Lagers liegt, zu den beiden Stictaceengattungen nicht paßt.

Lobaria und *Sticta* besitzen eine paraplektenchymatische Lagerrinde, die Rinde der *Chaudhuria* ist plektenchymatisch. Dieser Unterschied erscheint mir

wesentlich. Ich bin geneigt, bei den Laub- und Strauchflechten aller Entwicklungsreihen die plektenchymatische, beziehungsweise prosoplektenchymatische Rinde als das Merkmal eines phylogenetisch höher entwickelten Typus anzusehen. Dieser Umstand wäre kein Hindernis, die neue Gattung bei den Stictaceen unterzubringen. Liegen doch die Verhältnisse ähnlich als wie bei den Physciaceen; *Physcia* besitzt eine para-, *Anaptychia* eine prosoplektenchymatische Lagerrinde und doch sind beide nahe verwandt.

Von der Lageranatomie abgesehen unterscheidet sich *Chaudhuria* von *Sticta* durch das Fehlen von Zyphellen und Pseudozyphellen und stimmt damit mit *Lobaria* überein. Gänzlich verschieden ist der Sporenbau. Die Lobarien besitzen durchwegs schmale Sporen mit einer bis mehreren dünnen Querwandungen; eine plakodiomorphe Spore wurde bei ihnen bisher nie gesehen. Wohl aber bei *Sticta (St. physciospora).* So zeigt *Chaudhuria* in Lagerbau Anklänge an *Lobaria,* in bezug auf die Sporen an *Sticta.*

Immerhin läßt sich *Chaudhuria* zu den Stictaceen stellen, solange der pyknokonidiale Apparat unbekannt ist, aber die Diagnose der Stictaceen wird erweitert werden müssen.

Ganz auffällig ist die Blaufärbung der Rinde durch Jod, welche meines Wissens bisher bei keiner anderen Flechte beobachtet wurde.

In diesem Zusammenhang seien hier einige Bemerkungen über die Umgrenzung der Gattung *Sticta* eingeschaltet. Diese einheitliche und natürliche Gattung wird neuerlich recht schablonenhaft in Splittergattungen zerlegt. Ich meine, mit Unrecht, wenn man die der Zersplitterung zugrunde gelegten Merkmale auf ihren systematischen Wert prüft. Die Verschiedenheit des Algenkomponenten wurde schon früher (Nylander) zur Gattungsumgrenzung benutzt, später wurde von diesem Merkmal wieder abgesehen, ohne indes für das eine oder andere Verfahren eine tiefere wissenschaftliche Begründung zu geben. Die Ergebnisse der sorgfältigen Untersuchungen, welche von Madame und F. Moreau durchgeführt wurden[1]), haben Klarheit geschaffen. Aus diesen geht hervor, daß der Gonidientypus nicht geeignet ist ein systematisches Merkmal zu bilden. Die Verfasser gehen sogar weiter, indem sie sagen: „une remarquable uniformité de structure se manifeste chez toutes *[Lobaria, Sticta, Stictina]* à tel point que la famille entière pourrait être considérée comme un grand genre dans lequel les groupements ordinairement admis n'auraient qu'une valeur subgénérique". Dazu sei nur bemerkt, daß man die Gattung *Lobaria* immerhin von *Sticta* abtrennen kann, denn zwischen dem Auftreten und dem Fehlen von Zyphellen bzw. Pseudozyphellen besteht kein Übergang. Ein weiteres Merkmal zur Zersplitterung suchte man in der Form der Rindendurchbrechung der Lagerunterseite und in der Farbe der Pseudozyphellen. Es gibt Arten mit Pseudozyphellen von gelber Farbe, die aber bei derselben Art (z. B. *Sticta carpoloma, St. aurora, St. crocata*) mitunter eine weiße Farbe

[1]) Recherches sur les Lichens de la famille des Stictacées (Annal. Scienc. Nat., Bot. sér. 10, vol. III, 1921, p. 298—376, 2 tab.).

zeigen. Solche Arten müßten gespalten und zumindestens bei verschiedenen Sektionen untergebracht werden. Das wäre aber entschieden kein richtiges systematisches Vorgehen. Auch der Unterschied zwischen echten und Pseudozyphellen ist nicht so tiefgehend, als man anzunehmen geneigt ist. Wer eine umfangreiche Sammlung von Sticten auf dieses Merkmal hin prüfen kann, wird sich davon überzeugen, daß es auch in dieser Beziehung nicht an Übergängen fehlt. Ich vermag daher auch der *„Pseudocyphellaria"* keine Gattungsberechtigung zuzuerkennen.

Leider besitzen wir keine Monographie der Gattung *Sticta*; eine solche wurde in sorgfältiger Bearbeitung von K. B. J. Forssell in Angriff genommen, aber durch das frühzeitige Hinscheiden dieses Forschers nicht zu Ende geführt. Es wird dem zukünftigen Monographen obliegen, zu zeigen, wie die *Sticta*-Arten nach der Gesamtheit ihrer Merkmale in verwandtschaftlichen Beziehungen stehen; ein Einzelmerkmal mag diese Frage nicht entscheiden.

Was oben in bezug auf den generischen Wert des Algenkomponenten gesagt wurde, gilt auch von den Peltigeraceen[1]). Es mag aber hier gleich betont werden, daß, wenn auch der Algenkomponent als Gattungsmerkmal bei den Stictaceen und Peltigeraceen versagt, derselbe in anderen Gruppen des Flechtenreichs von größter Bedeutung ist, allerdings zumeist noch in Verbindung mit anderen wesentlichen Merkmalen.

184. **Pertusaria** (sect. **Porophora) fukiensis** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, late expansus, substratum arcte obducens, tenuis, ad 0,1 mm crassus, subtartareus, cinereus, versus ambitum plus minus glaucescens, opacus, KHO—, $CaCl_2O_2$—, continuus, subleprosus, sorediis et isidiis non instructus, in margine passim linea tenui, nigricante cinctus; medulla alba, J—; gonidia cystococcoidea. Verrucae apotheciigerae sparsae, alte sessiles, sub- vel semiglobosae, ad basin constrictae, e rotundato irregulares, plus minus tuberculato-inaequales, usque 1,3 mm latae, thallo parum pallidiores, ad verticem demum depressae, KHO—, $CaCl_2O_2$—, 3—5 ostiolatae, ostiolis impressis, punctiformibus, obscuratis et primum annulo angusto cinctis; nucleus decolor, J violaceo-coeruleus; paraphyses fere capillares, densae, ramosae et subintricatae, eseptatae; asci cylindrico-oblongi vulgo 6, rarius 4 vel 8 spori; sporae uniseriales, decolores, simplices, oblongo-ellipsoideae, utrinque angustato-rotundatae, rectae, membrana duplici cinctae, membrana externa crassa, interna tenui, ambae ecostulatae, contentu granuloso-oleoso impletae, 60—75 longae et 30—32 μ latae. — Habitu *Pertusariam tetrathalamiam* (Fée) Müll. Arg. simulat, sed ab ea jam sporis membranis laevibus, non costulatis, differt.

China, prov. Fukien: Kulang prope Fudschou, corticola (Chung no. 606 b).

var. **Kushana** nov. var.

A typo differt verrucis apotheciigeris minoribus, 0,6—1 mm latis.

[1]) E. Moreau et Mdme: Recherches sur la famille des Peltigéracées (Annal. Scienc. Nat., Bot., sér. 10, vol. III, 1919, p. 29—138, 13 tab.).

China, prov. Fukien: Kushan prope Fudschou, 5—600 m. s. m., ad cortices laeves (Chung no. 445 a).

185. **Verrucaria lenticella** n. sp.

Thallus endolithicus, extus macula sat late expansa, ochraceo-isabellina, opaca, passim albide maculata, laevigata indicatus, in margine linea nigra non cinctus, sorediis et isidiis nullis; gonidia cystococcoidea, glomerata, saturate flavo-viridia, globosa, glomerulis passim elongatis et ± verticalibus, dispersis vel approximatis; hyphae hypothalli cellulas oleigeras, globosas, 16—12 μ latas, passim moniliformiter dispositas, crebras gerentes. Apothecia crebra, dispersa vel approximata, immersa, vertice nigro, nitido, lentiformi, ± 0,5 mm lato emergentia; excipulum subpyriforme, angustum, in parte superiore pallidum, in parte inferiore parum crassius, 8—10 μ lato et fuscum, sed nunquam fuligineum, circa verticem involucrello fuligineo, parum inaequaliter dilatato, 45—55 μ crasso, patulo, ad apicem rotundato circumdatum, inter involucrellum et excipulum adest stratum thallinum decolor, ex hyphis tenuibus et intricatis formatum, gonidia includens; hymenium decolor, partem interiorem excipuli occupans, J e coerulescente demum aeruginascens; periphyses partem superiorem excipuli insidentes, elongatae et densae, circa 1/3 longitudinis excipuli metientes, J cupreo-lutescentes; paraphyses mox confluentes; asci parvuli, ad 50 μ longi, anguste clavati, superne rotundati et membrana ibidem haud crassiore cincti, 4—6 (8?) spori; sporae uniseriales, simplices, decolores, ellipsoideae, utrinque rotundatae, rectae, membrana tenui cinctae, contentu aequaliter oleoso, 8—10 μ longae et 4—5 μ latae.

Istria: Pta. Ramaz infra urbem Altona, ad saxa calcarea submarina (J. Baumgartner).

Habituell ist die neue Art gut gekennzeichnet durch die relativ breiten, gewölbten, vom Involukrellum gebildeten Scheitel der Apothezien; auffallend sind die kleinen Schläuche und die kleinen Sporen, die zu 4 oder 6 im Schlauch liegen. Durch das nicht kohlige Exzipulum nähert sich *Verrucaria lenticella* der *Verrucaria parmigera* Stnr.

186. **Placynthium arboricolum** n. sp.

Thallus epiphloeodes, crustaceus, uniformis, usque 1 mm crassus, mollescens, obscure cervinus vel olivaceo-nigrescens, madefactus in aeruginosum vergens, opacus, KHO—, primum plagas continuas, sat expansas, demum pulvinulos majores et minores mixtos, ± dispersos formans, granuloso-inaequalis, sorediis et isidiis destitutus; protothallus parum visibilis, tantum hinc inde, ex hyphis formatur subtoruloso-filiformibus, leptodermaticis, nigricanti-coerulescentibus, 5—7 μ crassis, septatis et guttulis oleosis impletis; superne strato corticali angusto, decolore et plectenchymatico obductus, intus ex hyphis ± intricatis, crassis, leptodermaticis, submoniliformibus septatisque formatus; gonidia scytonemea, cellulis concatenatis, aeruginose olivaceis, late ellipsoideis vel subglobosis, catenis plus minus undulatis vel curvulis. Apothecia sat crebra, sessilia, habitu lecideina, revera biatorina, parva 0,2—0,5 mm

lata, primum obscure olivacea, demum nigra et nitida, e concaviusculo convexa, primum margine pertenui et prominulo cincta; excipulum dimidiatum, violaceo- vel coeruleo-nigricans, ex hyphis radiantibus, leptodermaticis et septatis formatum, gonidia nulla includens; hymenium superne dilute olivaceum, KHO—, non inspersum, caeterum decolor, purum, 60—65 μ altum, J intense violaceo-coeruleum; hypothecium crassum, sublentiforme, rufum; paraphyses filiformes, densae et strictae, gelatinose conglutinatae, simplices, eseptatae, ad apicem vix clavatae; asci oblongo-clavati, superne rotundati, membrana vix crassiore, 8 spori; sporae biseriales, decolores, subcylindricae, rectae ad apices subangustato-rotundatae, uniseptatae, septo et membrana tenui, ad septum non constrictae, 20—22 μ longae et 6—7 μ latae.

Istria, ad lacum Čepic, prope monasterium, ad corticem Mori (J. Baumgartner).

Die neue Art steht dem sehr veränderlichen *Placynthium nigrum* sehr nahe. Vom Substrat abgesehen, sind die schmalen, walzlichen Sporen, das Auswachsen des krustigen Lagers in Polsterchen, der schwach entwickelte Protothallus, die entschieden kleineren Apothezien und das helle Epithezium Merkmale, welche in ihrer Gesamtheit eine artliche Abtrennung rechtfertigen können. Es muß bemerkt werden, daß *Placynthium nigrum* auch auf bearbeitetem Holz vorkommt, solche Stücke hat Hepp (Flechten Europas no. 9) verteilt; die Abbildung der Sporen, die er gibt, paßt aber auf unsere Flechte nicht.

187. **Lecanora** (sect. **Eulecanora**) **istriana** n. sp.

Thallus epiphloeodes, crustaceus, pulvinulos formans rotundato-irregulares, usque 2 cm latos et 2—3 mm altos, bene determinatos, substrato adhaerentes, lacteo-albus, fere opacus, KHO fulvescenti-flavus, $CaCl_2O_2$—, KHO + $CaCl_2O_2$ flavens, e verruculis dense confertis vel confluentibus, convexulis, 0,3—0,5 mm latis compositus, sorediis et isidiis non instructus, hypothallo distincto nullo; medulla alba, crassiuscula, J non tincta. Apothecia lecanorina, sessilia, dispersa vel approximata, rotunda vel pressione mutua subangulosa, ad basin leviter constricta, usque 1 mm lata; discus pallide vel rufescenti-testaceus, opacus, epruinosus, e concaviusculo subplanus; margo thallinus albus, tenuis, persistens, primum integer et demum minute crenulatus, gonidia infra hymenium et infra stratum corticale includens; excipulum integrum, sat tenue, decolor, ex hyphis tangentialibus, tenuibus et dense contextis formatum; hypothecium decolor; hymenium superne olivaceo-fuscum, superne strato amorpho, decolore et tenui passim supertectum, caeterum decolor, purum, 120—140 μ altum, J e coerulescente rufescens vel rufum; paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem vix latiores; asci oblongo-clavati, superne rotundati et membrana incrassata cincti, 8 spori; sporae biseriales, decolores, simplices, ellipsoideae vel subovales, utrinque rotundatae, rectae, membrana tenui circumdatae, contentu aequaliter oleoso, 15—18 μ longae et 7—10 μ latae. Pycnoconidia non visa.

Istria: ad viam publicam inter Pisino et Galligmano, c. 400 m. s. m., ad corticem Populi nigrae (J. Baumgartner).

Die Art dürfte der *Lecanora Menyhártii* Stnr. nahestehen, besonders was den Bau der Apothezien betrifft, verschieden ist sie aber durch ihre Wachstumsweise.

188. **Placolecania fumosula** n. sp.

Thallus epilithicus, subplacodinus, tenuis, ad 0,1 mm crassus, fere tartareus, sat late expansus, substrato adhaerens, obscure olivaceus vel nigricans, opacus, KHO—, $CaCl_2O_2$—, areolatus, areolis continuis vel passim insulatim coefertis, angulosis, 0,5—0,8 mm latis, planis vel concaviusculis, passim subsquamiformibus, lobi marginales paulum radiantes, breviusculi et continui; fissuris tenuibus separatis, superne laevigatis; soredia et isidia desunt; ad ambitum linea distincta, ad 0,5 mm lata, nigricante cinctus. Apothecia lecanorina, adpressa, dispersa, primum planiuscula, demum convexa, 0,3—0,7 mm lata, rotunda, ad basin leviter constricta; discus primum rufescenti-fuscus, opacus, demum in apotheciis convexis obscuratus et fere nigrescens; margo thallinus tenuis, subinteger, albescens, demum depressus, extus strato corticali angusto, bene limitato, fusco-nigricante obductus, intus decolor, gonidia copiosa, laete viridia continens; excipulum integrum, decolor, angustum, subchondroideum; hymenium superne fuscum, non pulverulentum, KHO—, NO_5—, caeterum decolor, purum, 90—100 μ altum, J violaceo-coeruleum; hypothecium decolor, angustum; paraphyses filiformes, strictae, simplices, eseptatae, ad apices capitato-clavatae et obscuratae, conglutinatae; asci ellipsoideo-clavati, superne rotundati et membrana incrassata cincti, 8 spori; sporae bi- vel subtriseriales, decolores et demum passim fumosulae, ellipsoideae, utrinque rotundatae vel biscoctiformes, uniseptatae, in medio bene constrictae, membrana sat tenui praeditae, septo tenui, 10—14 μ longae et 6—7 μ latae. Pycnoconidia non visa.

Istria: in colle Motolát ad canalum Arsa prope Traghetto, c. 75 m. s. m., ad saxa calcarea (J. Baumgartner).

Thallodisch bildet die Art einen Übergang von *Lecania* zu *Placolecania*.

189. **Catillaria heterocarpoides** n. sp.

Thallus pro maj. parte endolithicus, pars epilithica maculas sat late expansas, subpersicino-cinerascentes, dilute ochraceas vel albidas, opacas formans, continua vel parum distincte areolato-rimulosa, laevigata vel paulum inaequalis, isidiis et sorediis destituta, versus ambitum thalli fusco-cinerascens et in margine linea tenui, nigricante cinctus; gonidia cystococcoidea. Apothecia crebra, plus minus dispersa, biatorina, sessilia, rotunda, ad basin leviter constricta, 0,4—0,7 mm lata, nigra, opaca, epruinosa, madefacta passim obscure sanguineo-fusca, primum concaviuscula, demum convexa, margine proprio tenui, integro, nigro, primum prominulo, demum depresso, in sectione ad ambitum anguste et obscure fusco, intus decolore, ex hyphis subradiantibus et intricatis formato, gonidia nulla includente; hymenium superne latiuscule cinnamomeo-fuscum, non pulverulentum, strato tenui amorpho et decolore

obductum, NO_5—, KHO violascens, caeterum decolor et purum, 70—75 μ altum, J violaceo-coeruleum; hypothecium decolor; paraphyses filiformes, strictae, densae, conglutinatae, simplices, eseptatae ad apicem septato-capitatae; asci oblongo-clavati, superne late rotundati et membrana bene incrassata cincti, 8 spori; sporae biseriales, decolores, ellipsoideae, utrinque bene rotundatae, rectae vel curvulae, uniseptatae, ad septum non constrictae, septo et membrana tenui, 11—12 μ longae et 6—7 μ latae. — Differt a *C. athallina* thallo epilithico evoluto et hypothecio decolore, a *C. lenticulari* apotheciis multo majoribus et thallo alio.

Istria orientalis: ad saxa calcarea marina in Valle Vignole inter Altura et Carnizza et Pta. Pizzal ad Parenzo (J. Baumgartner).

Enumeratio lichenum europaeorum novorum rariorumque.

Auctore V. Gyelnik, Budapest.

I.

Eine Menge unbestimmter Flechten meines Vorgängers G. Timkó liegt im Herbar der Botanischen Abteilung des Ungarischen Nationalmuseums. Einen Teil dieser Flechten habe ich bearbeitet und veröffentliche diese im folgenden. Das bearbeitete Material bezieht sich nur auf *Parmelien, Agyrophoren* und *Gyrophoren.*

Parmelia aspidota (Ach.) Röhl. — Com. Pest Hungariae. Ad ramulos prunorum in valle Stara voda pr. pag. Izbég, alt. ca. 250 m. s. m. (Timkó, no. 5132). — Medulla K —, KC —, C —.

Parmelia Bitteriana Zahlbr. f. **grumosa** Gyelnik n. f. — Com. Pest Hungariae. Iuxta pag. Gödöllő, prope Fáczános ad cort. Carpini, alt. ca. 220 m. s. m. (Timkó, no. 2119. Typus). — Thallus versus centrum dense inaequaliter grumosus. Analoga *Parmelia physode* f. *granulosa* Harm. — Thallus superne sordide griseus, sorediosus, K + flavus, C —, KC —, sorediis granuloso-pulverulentis, partim caesiis, partim fuscis. Medulla alba K + sat flavescens, KC + sat rubescens, C —. — Observatio. *Parmelia Bitteriana* Zahlbr. (*Parmelia farinacea* Bitt.) ist bisher aus Ungarn unbekannt gewesen. Es ist bemerkenswert, daß ich sie in der Umgebung von Budapest, in einem ziemlich gut durchforschten Gebiet, entdecken konnte. Man wird sie wahrscheinlich noch an weiteren Standorten auffinden.

Parmelia dubia (Wulf.) Schaer. var. *ulophylla* (Ach.) Harm. — Com. Zala Hungariae. Ad cort. Fraxini in silva Cserőlak pr. pag. Felsőörs, alt. ca. 250 m. s. m. (Timkó, no. 5092). — Transsilvania, Mikeszász im Radákscher Walde an alten Buchenstämmen (Barth. sub *Parm. Borreri* f. *marginata*). — Thallus ad marginem limbiformiter sorediosus, superne non, vel rariter hic illic etiam maculato-sorediosus, sorediis pulverulentis, albis. React. Thallus K + flavus, KC —, C —, medulla K —, KC + rubescens, C + rubescens, soredia K —, KC + rubra, C + rubra.

var. **maculato-sorediosa** Gyelnik n. var. — Com. Vas. Ad corticem Carpini in silvis pr. pag. Gyimótfalva, alt. ca. 400 m. s. m. in Hungaria (Fóriss, no. 4237). — Dalmatia. Auf Obstbäumen (Pappafava. Typus). — Exs. *Imbricaria Borreri* Koerb. Lich. sel. Germ. 395. — Thallus superne dense maculato-sorediosus, ad marginem non vel rariter etiam hic illic limbiformiter sorediosus, sorediis plus minusve elevatis, pulverulentis, albis vel sordide albis. React. Thallus K + flavus, C —, KC —.

Medulla K —, KC + rubescens, C + rubescens. Soredia K —, KC + rubra, C + rubra.

var. **deliblatensis** Gyelnik n. var. — Com. Temes Hungariae. Ad cort. Pini nigrae, in parte silvatica Dolina in Deliblati homokpuszta, ca. 150 m (Timkó, no. 3209. Typus.) — Thallus ut in var. *maculato-sorediosa* Gyel. sed soredia caesio-grisea, granulosa, versus centrum thalli confluentia et crustam areolatam compactam fuscam formantia. React. Thallus K + flavus, C —, KC —. Medulla K —, C + rubescens, KC + rubescens. Soredia K + flava, C + rubra, KC + rubra. Observatio. Bemerkenswert ist bei dieser Pflanze, daß die Soredien in der Mitte des Lagers nicht bloß eine zusammenhängende Kruste bilden, sondern hie und da zu keimen beginnen, so daß man auf dieser Soredienkruste zahlreiche kleine Lagerschuppen finden kann. Bei dieser Varietät färben sich die Soredien mit Kalilauge angetupft gelb, während die vorigen zwei Varietäten bisweilen unverändert bleiben. Es wäre gut, zu wissen, ob diese Reaktion nur bei diesen Exemplaren vorkommt, die von der Ungarischen Tiefebene stammen. Da ich aber nur dieses einzige Exemplar habe, kann ich die Frage nicht beantworten.

Parmelia fuliginosa (Web.) Nyl. f. *aterrima* Wedd. — Com. Pest Hungariae. Ad saxa arenacea in m. Ezüsthegy, pr. pag. Kaláz, alt, ca. 300 m. s. m. (Timkó, no. 5199). — Thallus nigro-olivaceo-fuscus, dense isidiosus, isidiis nigris. React. Medulla K —, KC + rubra, C + rubra.

Parmelia glomellifera Nyl. — Hungaria. Com. Pozsony. Ad rup. gneiss. iuxta Szentgyörgy, ca. 130 m. s. m. (Timkó). — Com. Pest. Ad rup. trachyt. in decl. m. Kőhegy iuxta Izbék, ca. 280 m. s. m. (Timkó, no. 4876). — Medulla K —, KC —, C —.

var. **balatonica** Gyelnik n. var. — Com. Veszprém Hungariae, ad lignum in pago Balatonalmádi, alt. ca. 110 m. s. m. (Timkó, no. 4949. Typus). — Thallus superne nigro-olivaceus, nitidus, substrato adpressus, isidiosus, isidiis tenuissimis, thallo concoloribus, densissimis, versus centrum thalli crustam areolatam formantibus. Sterilis. Medulla alba, K —, C —, KC + rubescens. Varietas lignicola. — Observatio. *Parmelia glomellifera* ist ein typischer Silikatbewohner. Meines Wissens ist diese Pflanze die erste *Parmelia glomellifera* von holzigem Substrat. Sie ist wenig von der silikatbewohnenden Stammform verschieden. Hauptsächlich weicht sie durch ihre dünnen, an das Substrat gedrückten Lager, ferner durch ihre dicht nebeneinander wachsenden Isidien, die in der Mitte des Lagers eine rissige Kruste bilden, von der Stammform ab.

Parmelia omphalodes (L.) Ach. f. *cinereoalbida* (Harm.) Magn. — Com. Szepes Hungariae, ad rup. granit. prope Jégvölgyi patak, in m. Magas Tátra, ca. 1600 m (Timkó, no. 3972). — Thallus cinereo-albidus, panniformis, lobis minutis, usque ad circ. 1,5 mm longis, dense imbricatis, numerosissimis. Isidia sorediaque desunt. React. Thallus K + flavus. Medulla K + flava deindeque rubra, C —.

Parmelia saxatilis (L.) Ach. var. *imbricatoides* Gyel. — Com. Szepes Hungariae, ad cort. Pini pumil. supra Oriási vizesés in valle Kistarpatakvölgy, in m. Magas Tátra, ca. 1430 m (Timkó, no. 3601).

Parmelia scortea Ach. f. **visegradensis** Gyelnik n. f. — Com. Pest Hungariae,, iuxta opp. Visegrád, ad rup. trachyt. sub Fellegvár, ca. 340 m (Timkó. Typus). — Thallus superne plus minusve pruinosus roseusque. In ceteris ut in typo. React. Thallus K + flavus. KC —, C —. Medulla alba, K —, KC —, C + rubescens.

Agyrophora (Nyl.) Gyelnik n. comb. — *Umbilicaria* sect. *Agyrophora* Nyl. in Flora vol. vol. LXI, 1878, p. 247; *Gyrophora* sect. *Agyrophora* Zahlbr. Cat. Lich. Univ. IV, 1927, p. 677 (ubi syn.).

Agyrophora leiocarpa (DC.) Gyelnik n. comb.; *Umbilicaria leiocarpa* DC. ap. Lam. et DC. Fl. Fr. ed. 3. vol. II, 1805, p. 410; *Gyrophora leiocarpa* Gyel. in herb.; DuRietz in Arkiv f. Bot. XIX, 1925, p. 7. — Com. Szepes Hungariae, ad rup. granit. iuxta lac. Öttó, in m. Magas Tátra, ca. 2020 m (Timkó, no. 3112). — Ad rup. granit. in decl. m. Pfinn kilátó kup in m. Magas Tátra, ca. 2150 m (Timkó, no. 3099 pro parte). — Ad rup. granit. in decl. m. Nagyszalóki csucs in m. Magas Tátra, ca. 2350 m (Timkó, no. 4059). — Ad rup. granit. iuxta lac. Genersich tó, in valle Nagytarpataki völgy, in m. Magas Tátra, ca. 1880 m (Timkó, no. 3584). — React. Thallus K —, C —, KC —. Medulla K —, C —, KC —.

Agyrophora decussata (Vill.) Gyelnik n. comb.; *Lichen decussatus* Vill. Hist. Plant. Dauphin. vol. III, 1789, p. 964, tab. LV.; *Gyrophora decussata* Zahlbr. Cat. Lich. Univ. IV, p. 678 (ubi syn.); *Gyrophora reticulata* Gyel. in herb.; DuRietz in Arkiv f. Bot. XIX, 1925, p. 9. — Com. Szepes Hungariae, ad rup. granit. in decl. m. Nagyszalóki csucs, in m. Magas Tátra, ca. 2350 m (Timkó, no. 4058), — ad rup. granit. iuxta lac. Öttó, in m. Magas Tátra, ca. 2020 m (Timkó, no. 3111), — ad rup. granit. in decl. m. Pfinn kilátó kup. in m. Magas Tátra, ca. 2150 m (Timkó, no. 3099 pro parte). — React. Thallus K —, C —, KC —. Medulla K —, C —, KC —.

Gyrophora cylindrica (L.) Ach. f. exasperata Mudd. — Com. Szepes Hungariae, ad rup. granit. prope lac. Kék. to, ca. 1900 m (Timkó, no. 2523). — Magas Tátra, ad rup. granit. ad r. Vörös tó, ca. 1800 m (Timkó, no. 2500), — ad rup. granit. iuxta lac. Kitaibel tó, in valle Nagytarpataki völgy, in m. Magas Tátra, ca. 1920 m (Timkó, no. 3579).

f. *fimbriata* Ach. — Com. Szepes Hungariae, ad rup. aren. quarz. in decl. Stösschen in m. Magas Tátra, ca. 1500 m (Timkó, no. 3293), — ad rup. aren. in Kopanyereg in m. Magas Tátra, ca. 1800 m (Timkó, no. 3426), — Magas Tátra, ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2492).

f. **subfimbriata** Gyelnik n. f. — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2332), — ad rup. granit. sub lac. Jeges tó, versus Ganek in m. Magas Tátra, ca. 1900 m

(Timkó, no. 4000, Typus). — Thallus polyphyllus, lobis minoribus, numerosis, imbricatis, superne plus minusve levis, ad marginem mox aciliatus.

f. *laciniata* (Retz.) Zahlbr. — Com. Szepes Hungariae, ad rup. granit. iuxta lac. Öttó, in m. Magas Tátra, ca. 2020 m (Timkó, no. 2073), — ad rup. granit. in m. Magas Tátra, iuxta lac. Csorba tó, 1450 m (Timkó), Com. Liptó Hungariae, ad rup. granit. in valle Kamenista, in m. Magas Tátra, ca. 1050 m (Timkó), ad rup. granit. in m. Magas Tátra, in valle Koprova, ca. 1150 m (Timkó).

f. *denudata* (Turn.) Mudd. — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. in r. lac. Vörös tó, ca. 1800 m (Timkó, no. 2506), — ad sax. granit. sub lac. Hincó tó, ca. 1940 m (Timkó, no. 2655).

f. *Delisei* (Nyl.) Sydow — Com. Szepes Hungariae, ad rup. granit. supra lac. Genersich tó, in valle Nagytarpataki völgy in m. Magas Tátra, ca. 1900 m (Timkó, no. 3580), — Magas Tátra, ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2490 et 2329), — ad rup. granit. iuxta lac. Öttó, ca. 2020 m (Timkó, no. 3064), — ad sax. granit. prope lac. Kék tó, ca. 2000 m (Timkó, no. 2529), — Com. Liptó, ad rup. granit. in valle Kamenista, in m. Magas Tátra, ca. 1100 m (Timkó).

f. **lacunoso-rugosa** Gyelnik n. f. — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. in valle Furkota völgy, ca. 1800 m (Timkó), — ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2491), — ad rup. granit. iuxta lac. Kitaibel tó, in valle Nagytarpataki völgy, ca. 1920 m (Timkó, no. 3575, Typus). — Thallus vulgo monophyllus, subtus dense rhizinosus (plerumque solum versus margines), superne versus centrum lacunoso-rugosus, versus periphaeriam rugosus, marginibus dense ciliatis. — Observatio. Clavis formarum hungaricarum *Gyrophorae cylindricae*.

1 a) Thallus polyphyllus, lobis numerosis, minoribus, imbricatis.
2 a) Thallus superne lacunoso-rugosus.
f. exasperata Mudd.
2 b) Thallus superne plus minusve levis.
3 a) Thallus ad marginem dense ciliatus.
f. fimbriata Ach.
3 b) Thallus ad marginem mox aciliatus.
f. subfimbriata Gyel.

1 b) Thallus monophyllus.
2 a) Thallus subtus mox arhizinosus (versus centrum plerumque nudus).
3 a) Thallus ad marginem dense ciliatus.
f. laciniata (Retz.) Zahlbr.
3 b) Thallus ad marginem mox aciliatus.
f. denudata (Turn.) Mudd (= nudiuscula Flot.)
2 b) Thallus subtus dense rhizinosus (plerumque solum versus margines).
3 a) Thallus superne plus minusve levis.
f. Delisei (Nyl.) Sydow.
3 b) Thallus superne lacunoso-rugosus.
f. lacunoso-rugosa Gyel.

Gyrophora depressa (Ach.) Röhling. — Com. Szepes Hungariae, ad rup. granit. in valle Tarpatak völgy, iuxta 2. vizesés, in m. Magas Tátra, ca. 1300 m Timkó, no. 3059).

Gyrophora deusta (L.) Ach. f. *brotera* Ach. — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2333), — ad rup. granit. in valle Furkota völgy, ca. 1550 m (Timkó).

f. *squamigera* (Leight.) Zahlbr. — Com. Szepes Hungariae, Magas Tátra, ad rup. aren. quarz. iuxta Drechlser házacska, in valle Fekete viz völgye, ca. 1100 m (Timkó, no. 2282), — ad rup. granit. prope Jégvölgyi patak, ca. 1550 m (Timkó, no. 3962); — ad rup. granit. in decl. Kis Viszoka ca. 2300 m (Timkó, no. 3650).

f. *subpapulosa* (Nyl.) Zahlbr. — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. in r. lac. Vörös tó, ca. 1800 m (Timkó, no. 2507). — Com. Liptó Hungariae, ad rup. granit. in valle Koprova montis Magas Tátra, ca. 1250 m (Timkó), — ad rup. granit. in valle Kamenista montis Magas Tátra, ca. 1050 m (Timkó).

Gyrophora hirsuta (Sw.) Ach. f. vulgaris (Schaer.) Gyelnik n. comb. — *Gyrophora depressa* var. *hirsuta* f. *vulgaris* Schaer. in Naturw. Anzeiger der Allgemein. Schweizer. Gesellsch. für die gesamt. Naturw. vol. I, 1818, p. 6. — Com. Liptó Hungariae, Magas Tátra, ad rup. granit. supra lac. Skok tó, ca. 1830 m (Timkó, no. 2624), — Com. Szepes Hungariae, Magas Tátra, ad rup. granit. supra Felkai vizesés, ca. 1820 m (Timkó, no. 3617), — ad rup. granit. iuxta lac. Zöld tó, ca. 1550 m (Timkó, no. 2331), — ad rup. granit. supra Királyorr, ca. 2350 m (Timkó, 4054), — ad rup. granit. in decl. Pfinn kilátó kup, ca. 2150 m (Timkó, no. 3098). — Thallus horizontaliter diffusus, monophyllus vel vulgo minus polyphyllus, magnus, diametr. usque ad 7—8 cm, superne plus minusve levis, pulverulento-pruinosus, subtus plus minusve dense rhizinosus. Thallus C+ plus minusve rubescens. Planta alpina. — Observatio. Man kann die Reaktion am besten wahrnehmen, wenn man die Bereifungsschicht mit einer Lanzette von der Lageroberseite abkratzt.

f. **radiato-rugosa** Gyelnik n. f. — Com. Szepes Hungariae, ad rup. granit. iuxta lac. Öttó, in m. Magas Tátra, ca. 2020 m (Timkó, no. 3113. Typus). — Similis f. *vulgari* (Schaer.) Gyel. sed thallus superne radiato-rugosus. Forma alpina.

f. **suprafasciculata** Gyelnik n. f. — Com. Liptó Hungariae, ad rup. granit. in valle Koprova in m. Magas Tátra, ca. 1250 m (Timkó. Typus). — A f. *vulgare* (Schaer.) Gyel. differt thallo superne fasciculato-rhizinoso. Fasciculi rhizinarum sparsi, sat numerosi, nigri. Forma alpina.

var. **protomatrensis** Gyelnik n. var. — Com. Heves. Mátra: ad rup. trachyt. in jugo m. Disznókő iuxta pag. Ohuta, ca. 700 m (Timkó, no. 4546 et 4547. Typus). — Thallus polyphyllus, lobis adscendentibus, imbricatis, ad margines flexuosis, diametr. vulgo 1—10 mm usque ad

20(—25) mm, superne areolato-pruinosus, subtus rhizinosus (plerumque partim glabrescens), tenuiter areolatus (nonnunquam versus centrum levis), C + rubescens. Sterilis. Forma collina. — Observatio. Formae hungaricae *Gyrophorae hirsutae:*

1 a) Thallus vulgo monophyllus vel minus polyphyllus, magnus (diametr. usque ad 7—8 cm), non vel sub-adscendens. Plantae alpinae.
2 a) Thallus superne radiato-rugosus.
f. **radiatorugosa** Gyel.
2 b) Thallus superne plus minusve levis.
3 a) Thallus superne cum fasciculis rhizinarum instructus.
f. **suprafasciculata** Gyel.
3 b) Thallus superne glaber.
f. **vulgaris** (Schaer.) Gyel.
1 b) Thallus polyphyllus, parvus (diametr. vulgo 1—10 mm), adscendens. Plantae collinae.
var. **protomatrensis** Gyel.

Gyrophora tornata Ach. — Com. Szepes Hungariae, ad rup. granit. sub lac. Jeges tó, versus Ganek, in m. Magas Tátra, ca. 1900 m (Timkó, no. 3999). — ad rup. granit. Magas Tátra, in valle Furkota völgy, ca. 1800 m (Timkó).

Gyrophora vellea (L.) Ach. — Com. Szepes Hungariae, ad rup. granit. in decl. Pfinn kilátó kup, in m. Magas Tátra, ca. 2150 m (Timkó, no. 3101).

II.

Wenn man die Flechtenvegetation der Nadelbäume (*Pinus*-Arten, *Larix*- und *Picea*-Arten) mit der der Laubbäume vergleicht, sieht man sofort, daß die Arten, die ebenso auf Laubbäumen als auf Nadelbäumen leben, voneinander abweichen. Auf Laubbäumen haben diese Flechtenarten eine graue, auf Nadelbäumen dagegen eine lebhafte grüne Farbe. So z. B. ist *Parmelia physodes* auf Laubbäumen immer grau ohne den geringsten grünlichen Farbton. Auf *Pinus silvestris* dagegen hat sie eine deutlich grüne Farbe, die schon von weitem auffällt, wenn man sie auf einem Laubbaum und einem Nadelbaum nebeneinander sieht. Nach meiner Beobachtung in der freien Natur habe ich grüne Formen auf *Pinus silvestris, Pinus nigra, Pinus montana, Larix decidua, Picea excelsa* gefunden, und zwar in den alpinen Gebieten ebenso wie in der Tiefebene. Solche grünen Formen wurden bereits beschrieben: *Parmelia physodes* var. *glaucoides* Gyel.; *Parmelia physodes* f. *pinicola* Gyel.; *Parmelia caperata* var. *subglabra* (Gas.) Nyl. Zu diesen Formen muß ich noch einige hinzufügen. Die Eigenschaft muß beim Sammeln notiert werden, da sie im Herbarium nach spätestens 1—2 Jahren verschwindet. Wichtig ist auch, ob man die Flechte auf lebendem Nadelbaum gesammelt hat, denn auf abgestorbenen Bäumen oder Ästen zeigt sich dieser Farbenunterschied nicht. Auch Bitter (in Hedwigia XL, 1901, p. 171—274) erwähnt den hier behandelten grünen

Farbton, aber er hat ihn nicht richtig erkannt. Die Exemplare der hier behandelten Formen sind im Flechtenherbar der Botanischen Abteilung des Ungarischen Nationalmuseums zu Budapest („mus. Budapest") aufbewahrt.

Parmelia physodes var. *glaucoides* Gyel. — Austria, prope oppidum Salzburg, in monte Gaisberg, ad cort. Piceae excelsae, alt. ca. 900 m. s. m. (Gyelnik). — Ebendort, in cacumine montis, alt. 1250 m. s. m. ad cort. Laricis deciduae (Gyelnik). — Helvetia, prope oppidum Zürich, sub cacumine montis Zürichberg, ad cort. Laricis europ. (Gyelnik).

Parmelia Bitteriana var. **piceicola** Gyelnik n. var. — A typo differt thallo superne laete viride, sorediis viridescentibus. — Austria. Prope oppidulum St. Gilgen, in monte Schafberg, ad Piceam excelsam, alt. ca. 1000 m. s. m. (Gyelnik, Typus).

Parmelia saxatilis var. **pseudoviridis** Gyelnik n. var. — Similis *Parmeliae saxatili* sed thallus superne non isidiosus et laete viridis (in herbario evanescens). Lobi angusti, dichotomiter ramosi, separati, longi. — Austria, prope oppidulum St. Gilgen, in monte Schafberg, ad cort. Piceae excelsae, alt. ca. 800 m. s. m. (Gyelnik. Typus).

Parmelia caperata var. *subglauca* (Gas.) Nyl. — Austria, prope oppidulum St. Gilgen, in monte Schafberg, ad corticem Laricis deciduae, alt. ca. 700 m. s. m. (Gyelnik).

Parmeliopsis diffusa var. **evanescenti-virens** Gyelnik n. var. — Thallus superne laete viridis (in herbario evanescens). Sorediis etiam laete viridibus (in herb. evanescentibus). — Austria, prope oppidulum St. Gilgen, sub cacumine montis Schafberg, ad cort. Pini montanae, alt. ca. 1650 m. s. m. (Gyelnik. Typus.) — Etiam ad cort. Piceae excelsae.

Baeomyces rufus var. **piceicola** Gyelnik n. var. — Thallus ut in f. *subsquamulosa* Nyl. sed laete viridis. Corticola. — Austria, prope oppidulum St. Gilgen, in monte Schafberg, ad cort. Piceae excelsae, alt. ca. 1000 m. s. m. (Gyelnik. Typus).

III.

Physcia grisea (Lam.) Zahlbr. var. **neogrisea** Gyelnik n. var. — Thallus lobatus, lobis numerosis, quasi squamiformibus, plus minusve imbricatis, ad margines sorediatis, sorediis isidialibus, fusco-brunneis, albo-pulverulentis. — Hungaria. Budapest: Remetehegy, ad cort. Quercus (Gyelnik. Typus in mus. Budapest).

Physcia tenella (Scop.) f. **calcicola** Gyelnik n. f. — A f. *saxicola* (Malbr.) differt thallo superne non omnino sed solum in apice albo. — Das Lager ist durchweg grau, nur an den Lappenenden schneeweiß. Felsbewohnend. — Hungaria. Budapest: Remetehegy, ad rup. calcar. (Gyelnik. Typus in mus. Budapest).

Anaptychia penicillifera (Lettau in Hedwigia LII, 1912, p. 251) Gyelnik n. comb. — Hungaria, com. Borsod, ad corticem Fraxini, in cacum. m.

Örvénykő, pr. p. Varbó, alt. ca. 670 m. s. m. (Fóriss, no. 4739, sub *Anapt. ciliar.* Herb. mus. Budapest et herb. Fóriss, Miskolc). — Similis *Anaptychiae ciliari* (L.) Mass. sed ciliae thalli ad apices albo-pulverulentae. — Thallus superne omnino pubescens, K —, C —, KC —, ad marginem nigro-ciliatus, ciliis ad apices albo-pulverulentibus (quasi sorediosis, cf. Lettau l. c.). Pars pulverata ciliarum K —, C —, KC —. Medulla thalli J —, K —, C —, KC —.

Ramalina deliblatensis Gyelnik n. sp. — Habitu similis *Ramalinae farinaceae* (L.) Ach. Thallus sat nervosus, K —, C —, KC + citrinus, ad marginem sorediosus, sorediis flavescentibus, K + flavescentibus, KC —, C —, granuloso-pulverulentis. Medulla alba, K —, C —, KC —. — Hab. in Hungaria, com. Temes, ad cort. Populi, in parte Rosiana, Deliblati homokpuszta, alt. ca. 170 m. s. m. (Timkó, sub *Ramalina farinacea.* No. 3225 in herb. mus. Budapest. Typus).

Ramalina intermixta Gyelnik n. sp. — Habitu similis *Ramalinae farinaceae* (L.) Ach. Thallus sat levis, K —, C —, KC + citrinus, ad marginem sorediosus, sorediis flavescentibus, K + flavescentibus, KC + flavescentibus, C —, partim granuloso-pulverulentis, partim cum laciniis adventivis, tenuibus, densis, sat longis, thallo concoloribus, ramosis, cylindricis vel minus planis instructis. Medulla alba, K + flavescens, KC + leviter rosea (?). — Hab. in Hungaria, com. Heves, prope Saár, ad cort. Quercus, in m. Sárhegy, alt. ca. 460 m. s. m. (Kümmerle et Timkó, sub *Ramalina calicare.* Typus in herb. mus. Budapest).

Ramalina debrecenensis Gyelnik n. sp. — Habitu similis *Ramalinae farinaceae* (L.) Ach. Thallus sat nervosus et lacunosus, K —, C —, KC + citrinus, ad marginem sorediosus, sorediis albis, omnino cum laciniis adventivis, plus minusve tenuibus, densissimis, sat longis, thallo concoloribus plus minusve ramosis, plerumque cylindricis vel nonnunquam planiusculis instructis. Medulla alba, K + flava, KC —, C —. — Hab. in Hungaria, com. Hajdu, Debrecen, in silvis Ohati erdő ad cort. Quercus (Tamássy, no. 149, sub *Ramalina farinacea* v. *phalerata.* Typus in herb. mus. Budapest).

Ramalina balatonica Gyelnik n. sp. — Similis *Ramalinae polymorphae* Ach. sed medulla K + flava (non K —) et laciniae thalli valde numerosae, angustae, breves, caespitem compactum formantes. Soredia marginalia et partim superficialia. — Hab. in Hungaria, vom. Zala, ad rup. basalt. in decl. m. Szentgyörgyhegy, iuxta pag. Kisapáti, alt. ca. 400 m. s. m. (Timkó. Typi no. 4279 et 4280 in mus. Budapest).

Ramalina fraxinea (L.) Ach. f. n. **ventifera** Gyelnik. — Similis f. *ampliatae* Ach. sed thallus irregulariter verrucoso-rugosus et laciniis adventivis squamiformibus, plus minusve magnis, varie formatis, dense instructus. — Hab. in Hungaria, ad cort. Populi nigrae, in m. Vérteshegység, prope Csákvár comitatu Fejér, alt. ca. 140 m. s. m. (Timkó. Typus no. 2035, sub *Ramalina fraxinea* in herb. mus. Budapest).

Parmelia physodes f. **pinicola** Gyelnik n. f. — A var. *glaucoide* Gyel. (in Folia Cryptog. vol. I, no. 6, 1928, p. 590) differt thallo versus centrum irregulariter valde verrucoso, verrucis vulgo 0,2—0,3 mm magnis. — Budapest in Hungaria. In monte Budaőrsi hegy, ad cort. Pini nigrae, alt. ca. 350 m. s. m. (Gyelnik. Spec. orig. in herb. mus. Budapest).

Parmelia saxatilis var. **imbricatoides** Gyelnik n. var. — Lobi thalli angusti, numerosi, imbricati. Thallus superne isidiosus. React. Thallus C—, KC—, K + flavus deindeque rubescens. Medulla C—, K + flava deindeque rubescens. — Hab. in Finlandia, Ab., Raisio, Artukainen, ad scopulos (Linkola, Typus in mus. Budapest).

Parmelia rosaeformis (Ach.) Gyel. f. **fagicola** Gyelnik n. f. — A typo differt laciniis angustis, longis, separatis. Forma fagi-corticola. In fageto. — Hungaria. In cort. Fagi silvaticae, iuxta Donnea erdőőriház, prope Kudsir, alt. ca. 1000 m. s. m. com. Hunyad (Fóriss, sub *Parm. saxat.* Typus in herb. mus. Budapest). — Com. Borsod, Montes Bükk, prope Bánkut, alt. ca. 700 m. s. m. ad cort. Fagi silvaticae (Gyelnik in herb. mus. Budapest). — Die neue Form *fagicola* ist in unseren Fagus-Wäldern überall aufzufinden. Sie ist durch ihre schmalen und relativ langen Abschnitte, die einander nicht berühren, sondern getrennt sind, gekennzeichnet. Die Länge und Breite der Abschnitte ist schwankend. — Thallus K + flavus, KC—, C—. Medulla alba, K + flava deindeque rubra, KC—, C—. Soredia K + flava deindeque rubra, KC—, C—.

Parmelia conspersa f. **Matrae** Gyelnik n. f. — Com. Heves Hungariae, in montibus Mátra, in cacumine montis Saskő, ad rupem andesiticam, alt. ca. 750 m. s. m. (Gyelnik. Typus in herb. mus. Budapest). — A *Parmelia conspersa* var. *stenophylla* Ach. differt discis viridibus (non badiis). Thallus subtus roseus. Isidia desunt. React. Thallus K + lente rubescens. Medulla K + lente rubescens. Discus K + lente rubescens. — Teratologia?

Parmelia vittata (Ach.) Röhl. var. **alpina** Gyelnik n. var. — Thallus lobis primariis elongatis (usque ad 40—50 mm longis), angustis (circ. 1—3 mm latis), separatis, lobis adventivis nullis. Forma typica alpina. — Norvegia. Ringeben (Blytt, sub. *Parm. vittata.* Herb. mus. Budapest). — Helvetia. Mt. Blanc, Contamines (?, no. 398, sub *Imbr. ceratoph. v. vittata.* Typus in herb. mus. Budapest). — Hungaria. Ad cort. Abietis, ad Késmárki itató, in m. Magas Tátra, alt. ca. 900 m. s. m. Com. Szepes (Timkó, no. 2948, sub *Parmelia vittata.* Herb. mus. Budapest).

f. **latilobata** Gyelnik n. f. — Thallus lobis primariis plus minusve brevibus (usque ad 30 mm longis), latis (circ. 4—5 mm latis), separatis, lobis adventivis praesentibus, plus minusve numerosis, brevibus (usque ad 15 mm longis), angustis (vulgo 1—1,5 mm latis). Forma alpina. — Norvegia. In locis depressioribus rupium sat umbrosis muscis lichenibusque vestitis regionis arborum prope nudae ad Roegefjord provinciae Sta-

vangeriensis (Havaas. Lich. Norv. occ. exs. no. 14 sub *Parmelia vittata*. Typus in herb. mus. Budapest).

var. *alpestris* Zahlbr. in Verh. zool.-bot. Ges. Wien LXXVI, 1927, p. 95. — Thallus panniformis, lobis primariis plerumque deficientibus, lobis adventivis numerosissimis, brevibus, angustissimis, dense imbricatis. Forma alpina. — Hungaria. Ad terram graminosam in declivibus versus m. Fehértavi csucs, in Kopanyereg, in m. Magas Tátra, ca. 1850 m. s. m. com. Szepes (Timkó, no. 3433, sub *Parmelia vittata*. Herb. Mus. Budapest).

var. **collina** Gyelnik et Fóriss n. var. — Thallus lobis primariis, brevibus (usque ad 20—25 mm longis), angustis (circ. 1/2—3 mm latis), separatis, lobis adventivis praesentibus, angustis (circ. 2—3 mm latis), brevibus (usque ad 10—15 mm longis), subimbricatis. — Forma collina. — Hungaria. Montes Bükk: Lillafüred in decl. orient. Szárteke, ad saxa porphyrica, alt. ca. 450 m. s. m. (Fóriss, sub *Parm. obscurata*, no. 6428. Typus in herb. Fóriss, Miskolc et in herb. mus. Budapest).

Letharia vulpina (L.) Hue f. **europaea** Gyelnik n. f. — Thallus diffuso-, granuloso-pulverulento, flavo-viridulo sorediosus, lacunosus. Apothecia minora, diametr. usque ad 3—4 mm, margine thallode non prolifero, sorediosо, subtus calcaribus plus minusve longis instructa. — Tirolia: ad asseres in montibus Schönberg et Rinderberg in valle Stubaital (Schuler in Krypt. exs. no. 878. Typus sub *Letharia vulpina* in mus. Budapest). — Lager in allen Teilen sorediös. Soredien unbegrenzt. Die Lageroberfläche lößt sich mehr oder weniger in unregelmäßige staubig-körnige Soredien auf. Lageräste unregelmäßig grubig. Apothezien klein. Durchmesser höchstens 3—4 mm, am Rande sorediös, fast ganzrandig. Lagerrand verästelt sich nie. Unterseite spornig. Der Sporn ist immer vorhanden, mehr oder weniger lang.

f. **venosa** Gyelnik n. f. — Thallus diffuso, granuloso-pulverulento, flavo-viridulo sorediosus, venosus (non lacunosus). Sterilis. — Helvetia. An Pinus cembra. Avers (H. Wegelin, sub *Evernia vulpina*. Typus in herb. mus. Budapest). — Die Soredien sind dieselben wie bei *Letharia vulpina* f. *europaea*. Die Lageräste sind nicht grubig, sondern geadert und sehen einer dichteren Flechte, die aus mehreren dünneren Fäden geflochten ist, ähnlich.

f. **isidialia** Gyelnik n. f. — Thallus diffuso-sorediosus. Soredia partim isidialia, flavo-viridia. Sterilis. In ceteris ut in *Letharia vulpina* f. *europaea* Gyel. — Mt. Rosa (Zermatt), no. 299 (?, sub *Cornicularia vulpina* Typus in herb. mus. Budapest). — Soredien wenigstens teilweise isidienförmig. Die Soredienkörnchen fingen wahrscheinlich zu „keimen“ an und entwickelten zahlreiche kleinere und größere Adventiväste, wodurch die Pflanze einen fibrillösen Habitus erhielt.

Evernia prunastri (L.) Ach. f. **arenicola** Gyelnik n. f. — Thallus sat longus et latus, superne subtusque reticulato-rugosus, ad marginem bene maculato-sorediosus, sorediis viridescentibus, granuloso-pulverulentis.

Soredia K + flava, KC —, C —. Thallus superne K + viridescenti-flavus, KC + flavus, C —. Medulla alba, K —, C —, KC —. — Ad saxa arenacea permica in monte Öreghegy, pr. Balatonalmádi, comit. Veszprém Hungariae, alt. ca. 250 m. s. m. (Timkó, Typus in mus. Budapest).

Lobaria pulmonaria f. **asparagifera** Gyelnik n. f. — Soredia pro maxima parte isidialia, isidiis demum squamosis (quasi thalli juveniles sunt). In ceteris ut in forma typica. — Com. Vas Hungariae: Czák, in silva superiori ad pedes Quercuum (Gáyer, Typus in herb. mus. Budapest).

Lobaria pulmonaria Timkó in Bot. Közl. XIX, 1920—21, p. 87. „Ad truncum Fraxini pr. opp. Chelm, alt. ca. 200 m. s. m." Polonia = *Lobaria pulmonaria* f. *asparagifera* Gyel.

Solorina monospora Gyelnik in Magyar Botanikai Lapok 1930, p. 29; *Solorina bispora* var. *monospora* Frey. — E. Frey (Bern) war so liebenswürdig, mir das Originalexemplar der *Solorina bispora* var. *monospora* zur Untersuchung zu senden. Die Etikette lautet: „*Solorina bispora* Nyl. var. *monospora* Frey. Nationalpark. Val Müschauns, S.-Hang des P. d'Esan. Liasschiefer. Höhe 2300 m. ü. M. Expos.: SSE. 6. VIII. 1924. Leg. Ed. Frey." Das Exemplar befindet sich unter no. 661 im Herbar E. Frey in Bern. Eine Bemerkung habe ich neben der Pflanze gefunden: „Sporen fast ausschließlich 3-zellig, nur einzeln im Ascus. Hym. 190—230/1000 mm. Keine Zephalodienbildung bemerkbar. Sp.: 90—128: 30—44/1000 mm." Im folgenden gebe ich die lateinische Diagnose auf Grund meiner Untersuchungen: Thallus valde fragilis, parvus, diametr. 1,5—4 mm. Apothecia in centro thalli plerumque solitaria, rarissime dua. Margo thalli integer vel paullo flexuosus. Thallus superne levis, glaber, albo- vel roseo-pruinosus, K —, C —, KC —, subtus pallide roseus, rarissime rhizinosus, avenosus. Stratum corticale superius paraplectenchymaticum, cellulis rotundatis, 16—18 mikr. magnis. Medulla alba, K —, C —, KC —, hyphis hyalinis, articulatis, ramosis, 4—5 mikr. crassis. Gonidia palmellacea, globosa, viridia, 3,5—4,5 mikr. magna. Discus apothecii concavus, badius, levis, minus pruinosus vel nudus, glaber. Epithecium badium vel plus minus fuscum, J —. Hymenium hyalinum, 165—200 mikr. crassum, J + coeruleum, paraphysibus 1,5—2,5 mikr. crassis, hyalinis, eramosis, linearibus, non articulatis, ascis versus apices rotundatis, hyalinis, monosporis, 120—160 mikr. longis. Sporae pallide fuscae vel fuscae, ovoideo-elongatae, 2-septatae, ad apices rotundatae, 34—43 : 103—147 mikr. magnae, J —. Hypothecium fuscum vel pallide fuscum, J —.

Peltigera praetextata (Floerk.) Zopf f. **pellitoides** Gyelnik n. f. — Similis var. *viviparae* (Hazsl.) Gyel. sed thallus superne plus minusve erecto-tomentosus ut in *Pelt. canina* f. *pellita* Vain. — N. W. Böhmen: Über Hypnum auf Granitfelsen in Weigungsdorf, 710 m (Klement, sub *Peltig. praetext.* Typi in mus. Budapest et in herb. M. Servit, Horice v Podkrkonosi).

Peltigera scutata f. **isidiato-sorediosa** Gyelnik n. f. — Soredia omnino fusca, isidialia. — Rossia carp.: Stripa, 1929, leg. Nádvornik (I—77). — Die Pflanze habe ich von Herrn Dr. M. Servit (Horica v Podkrkonosi) bekommen. Das Originalexemplar liegt im Herbar M. Servit und dem der Bot. Abt. des Ung. Nat.-Museums in Budapest.

f. **alba** Gyelnik n. f. — Similis var. *subscabrosae* Gyel. sed thallus superne versus apices loborum verruculoso-pruinosus. Soredia omnino alba vel albo-cinerea, granuloso-pulverulenta. — An Aesculus. St. Bartholomä bei Berchtesgaden (Royer, sub *Peltig. scutata.* Typi in herb. J. Hillmann, Berlin et mus. Budapest).

Peltigera polydactyla (Neck.) Hoffm. f. **dactylifera** Gyelnik n. f. — Similis var. *crassoidi* Gyel. sed thallus digitatus. — Am Ostseestrande bei Müritz (Hillmann, sub *Pelt. polyd.* Typi in herb. J. Hillmann, Berlin et in mus. Budapest).

Peltigera variolosa (Maß.) Gyel. f. **subalba** Gyelnik n. f. — Ins. Spitzbergensis: Cap Thordsen, 1883 (R. Gyllencreutz, sub *Peltig. aphthosa.* Typus in herb. univ. Uppsala). Similis formae *microphyllinae* Gyel. sed thallus superne partim incusus.

f. **britannica** Gyelnik n. f. — Zeesdale, Durham (Mudd, W. sub *Peltigera aphthosa.* Typus in herb. univ. Uppsala). — Cephalodia squamaeformia, elevata, quasi petiolata. In ceteris ut in *Peltigera variolosa* (Mass.) Gyel. var. *leucophlebia* (Nyl.) Gyel. n. comb. (var. typica). — Bei der Stammform sind die Zephalodien warzenförmig und mehr oder weniger in das Lager eingesenkt (sie ähneln einem Kaiserbrötchen en miniature). Die Zephalodien dieser neuen Form ähneln den horizontalen Isidien der *Peltigera lepidophora* (Nyl.) Bitt. Sie sind schuppenförmig, am Rande mehr oder weniger gekräuselt, die Schuppen sind fast parallel mit der Oberfläche des Lagers und sind emporgehoben, quasi auf kurzen Stielen stehend.

Peltigera Lyngei Gyelnik n. sp. — Insulae Spitzbergenses: Kobbebay 1861 (A. J. Malmgren, sub *Peltigera scabrosa.* Typus in herb. univ. Uppsala). — Diese neue Art habe ich nach Bernt Lynge (Oslo) benannt, der die nordarktische Flechtenflora rastlos bearbeitet hat und der der beste Kenner und Forscher der nordarktischen Flechtenflora ist. — *Peltigera Lyngei* scheint eine seltene arktische Pflanze zu sein. Ich habe schon zahlreiche in diese Gruppe gehörende Exemplare gesehen, und im ersten Augenblick glaubte ich es mit einer Varietät oder einer unregelmäßig gewachsenen Pflanze zu tun zu haben. Nach eingehender Untersuchung mußte ich aber diese Auffassung aufgeben. Der Habitus des Lagers ist malaceoid, aber nicht so dick wie bei *P. malacea.* Die Oberseite ist dieselbe wie bei *P. genuina* (Koerb.) Gyel. (*P. scabrosa* Auctorum). Die Unterseite ist aber nicht geadert, sondern malaceaartig. Man kann also bei unserer Pflanze von *P. genuina* nicht sprechen, da die Unterseite der *P. genuina* deutlich geadert und außerdem von dicken faszikelartigen

Rhizinen, besonders nach der Mitte hin, dicht bedeckt ist. Bei unserer neuen Pflanze konnte ich keine Rhizinen finden (hie und da kann man nur kurze fadenförmige Rhizinenrudimente beobachten). Von faszikelartigen Rhizinen kann man gar nicht sprechen. — Die Unterseite des Lagers der *P. pulverulenta* (Tayl.) Krempelh. ist auch malaceaartig, Adern kann man daran gar nicht unterscheiden, aber sie ist dicht von kurz fibrillösen Rhizinen bedeckt, die fast eine zusammenhängende Schicht bilden. Unsere Pflanze kann also mit *P. pulverulenta* auch nicht identifiziert werden, da auf der Unterseite keine Spur der vorher beschriebenen Rhizinenverhältnisse zu finden ist. — Die kurze Diagnose unserer Pflanze ist folgende: Habitus thalli malaceoideus. Thallus foliaceus, superne omnino verruculoso-scabridus, nudus, glaber, opacus, subtus malaceaeformis avenosus, rarissime rhizinosus, rhizinis?. Sterilis. Similis *Peltigerae genuinae* (Koerb.) Gyel. (*P. scabrosa* Auctorum), sed thallus crassior, subtus malaceaeformis et rarissime rhizinosus, etc. — A *Peltigera pulverulenta* (Tayl.) Krempelh. differt rhizinis non densissimis sed rarissimis, etc.

Squamaria bakonyensis Gyel. — Auf Basalttuff-Felsen auf dem Berge Apáthi hegyalja, nächst Tihany, 140 m ü. d. M. in Komit. Zala in Ungarn (Timkó, sub *Lecanora subcircinata.* No. 4091).

Squamaria praeradiosa (Nyl.) Oliv. f. *farkasvoelgyensis* Gyel. — Bei Lodormany, ein freiliegendes Steinblöckchen in Siebenbürgen (Barth, sub *Placodio circinato* et b. *myrrhin* p. p.). — In der Kapsel sind 4 Exemplare aufgeklebt. Die No. 2 ist *Sq. praeradiosa* f. *farkasvoelgyensis* (Lager auf K sofort lebhaft rot). Auf No. 4 ist eine *Sq. carbonatica* var. *calcareo-arenicola* Gyel. zu finden, und darauf wächst eine *Sq. praeradiosa* f. *farkasvoelgyensis* Gyelnik (Thallus K + rubescens). No. 1 und 3 sind *Sq. carbonatica* var. *calcareo-arenicola* Gyel. Daß man auf demselben Stein eine *Squamaria* findet, die Übergangssteine zwischen Silikat und Karbonatsteinen liebt (*Sq. praeradiosa*), und auch eine *Squamaria* (*Sq. carbonatica*), die typisch kalk- (karbonatstein-) bewohnend ist, erklärt sich daraus, daß die Unterlage zwar größtenteils kalkhaltig ist, jedoch viel Sand enthält (Silikatgehalt). Diese Unterlage ist also für *Sq. praeradiosa* typisch, für *Sq. carbonatica* dagegen nicht. Deshalb ist auch letztere nicht typisch entwickelt, sondern nähert sich der *Sq. praeradiosa* dadurch, daß die Mitte des Lagers auch teilweise verruculös ist; die Form der Lazinien und die Reaktion weisen deutlich auf *Sq. carbonatica* hin. Die Arten der *Sq. radiosa*-Gruppe sind also auf reinem Gestein typisch entwickelt, bei den Übergangsgesteinen muß man jedoch sehr vorsichtig sein, da auf diesen nicht nur *Sq. praeradiosa,* sondern auch andere, wenn auch morphologisch etwas abgeänderte Arten ihre Lebensbedürfnisse finden können.

Squamaria carbonatica Gyel. var. **calcareo-arenicola** Gyelnik n. var. — A var. typica (var. nova **calcarea** Gyelnik si placet) differt thallo in centro verruculoso-areolato ut in *Sq. praeradiosa* (Nyl.) Oliv. Thallus

superne subfuscus, versus periphaeriam pruinosus, K —, versus centrum verruculoso-areolatus. — Fundort wie oben (No. 1 und 3 und teilweise 4).

Squamaria balatonica Gyel. var. **tihanyensis** Gyelnik n. var. — A typo (var. nova **basanitica** Gyelnik si placet) differt thallo superne tenuiter albo-pruinoso et lobulis marginatis angustioribus. Thallus K —. Medulla alba, K + flava deindeque lente rubescens. — Hungaria, com. Zala, in peninsula Tihany, in decl. m. Apáthi hegyalja, circ. 140 m. Auf Basalttuff-Gestein mit ganz geringem Kalkgehalt (Timkó, sub *Lecanora subcircinata.* Typus no. 4090 in mus. Budapest).

Aspicilia banatica Gyelnik n. sp. — Similis *Aspiciliae calcareae* (L.) sed thallus ad marginem subeffiguratus (effiguratiforme longe rimosus) et substratum speciei argillaceo-schistosum non calcareum. Thallus K —, nudus, albidus. Disci apotheciorum nigri, nudi, leves. — Ad saxa argillaceo-schistosa prope balneum Herculis in Banatu (Lojka, Typus no. 1162 in mus. Budapest).

Aspicilia Kümmerleana Gyelnik n. sp. — Similis *Aspiciliae calcareae* (L.) sed thallus ad marginem subeffiguratus et superne K + flavidus demum rubescens. Ab *Aspicilia cinerea* (L.) differt thallo ad marginem subeffigurato et substrato speciei calcareo. Disci apotheciorum nigri, nudi. — Insula Arbe Dalmatiae: ad saxa calcarea in formatione Macchia vallis Cifnata, alt. ca. 15 m. s. m. (Kümmerle, sub *Lecanora subcircinata.* Typus in mus. Budapest). — Diese Art habe ich zu Ehren des früh verstorbenen ungarischen Botanikers, des ausgezeichneten Pteridophytenkenners, meines Dienstkollegen Dr. J. B. Kümmerle benannt.

Icmadophila ericetorum (L.) Zahlbr. f. *inquirenda* Fóriss in Bot. Közl. XXV, 1928, p. 82. — Thallus albidus vel albido-griseus, granulosus, granulis tenuibus et crustam cohaerentem formantibus. Apothecia castanea, nuda, estipitata, irregulariter polyaedrica. Margo thallinus adest, pulverulentus, irregulariter valde flexuosus. — Similis var. *sphagnicolae* (Hazsl.) Gyel. sed apothecia alia. — Hungaria, com. Hunyad, ad terram graminosam, sub cacum. alp. Vrf. lui Petru, alt. ca. 2050 m (Fóriss. Typus no. 2083); — Ad terram sub cacum. alp. Surian, alt. ca. 1900 m (Fóriss, no. 1962).

Dermatocarpon Degenianum Gyelnik n. sp. — Thallus submonophyllus, diametr. 10—15 mm, superne levigatus, cinereus, nudus, ad marginem grosse auriculato-crispatus, subtus pallido-testaceus, levigatus, versus marginem valde reticulato-rugosus. A *Dermatoc. miniato* (L.) E. Fr. differt thallo superne nudo, subtus pallidiore et partim reticulato-rugoso. — Hungaria. Com. Modrus Fiume, iuxta Ogulin, in m. Klekhegy, ad saxa calcar. alt. ca. 1000 m. s. m. (Timkó, sub *Derm. miniat. v. umbilicat.* Typus in mus. Budapest). — Diese Art habe ich zu Ehren des Dr. A. von Degen (Budapest), des besten Kenners der Flora des Velebitgebirges, benannt.

Über einige Arten der Gattung Parmeliopsis (Stizenb.) Nyl.

Von V. Gyelnik, Budapest.

Das hier behandelte Material ist im Flechtenherbar der Botanischen Abteilung des Ungarischen Nationalmuseums in Budapest aufbewahrt.

Sect. **Viridifera** Gyelnik n. sect. Thallus superne viridis vel luteolo-viridis.

Parmeliopsis ambigua (*Lichen ambiguus* Wulf. apud Jacq. Collect. Bot. IV, 1790, p. 239) Nyl. Syn. Lich. II, 1863, p. 54; Zahlbr. Cat. Lich. Univ. VI, 1929, p. 10.

Thallus laciniatus, laciniis primariis planis, stellatis, laciniis adventivis deficientibus, superne viridescens vel luteolo-viridescens, K + flavescens, C —, KC + aurantiacus vel flavissimus, sorediosus, sorediis maculiformibus, flavescentibus, pulverulentis, K + flavis, C —, KC + aurantiacis (evanidis), subtus nigrescens. Medulla alba, K —, C —, KC + violascens.

Die KC-Reaktion des Markes muß besonders sorgfältig durchgeführt werden, da die Markschicht sehr dünn ist und schon mit Kalilauge angetupft so hyalin wird, daß die schwärzliche Unterseite sofort durchscheint und die angegebene KC-Reaktion auf dieser schwarzen Fläche nicht oder sehr schwer bemerkbar ist.

var. discreta Gyelnik n. var.

Laciniis thalli linearibus, vulgo 0,75 mm latis, sejunctis. Sorediis in lamina superiore thalli sparsis. Reactiones sicut in specie.

Exs. *Parmeliopsis ambigua* Nyl. et Norrl. Herb. Lich. Fenn. no. 210 (typus).

Hab. Fennia. In Tavastia australi, supra truncos pineos (Norrl. apud Nyl. et Norrl. Herb. Lich. Fenn. no. 210, sub *Parmeliops. ambigua.* Typus); in reg. Aboënse, Parainen, Bodnäs, ad lignum putridum (Linkola, sub *Parmelia ambigua*); Suecia. Härjedalen, Fjällnäs (Vrang, sub *Parmeliops. ambigua*); U. S. A. Colorado, Wardi, on pine, alt. 9000 ft. (C. C. Plitt, sub *Parmeliops. amb.*).

f. rotundata Gyelnik n. f.

Similis var. *discretae* Gyel. sed laciniis ad apices sat rotundatis, sat palmato-ramosis, non sejunctis. Reactiones sicut in specie.

Hab. Ad truncos *Fagi sylvaticae* in Ischaut (Lojka, It. Cauc. no. 445. sub *Parmelia ambigua.* Typus); Magas Tátra, Fenyőzsindelytetőn a „Késmárki Itató"-nál, ca. 900 m, Szepes vm (Timkó, sub no. 2716, *Parmeliops. amb.*).

f. humosa Gyelnik n. f.

Similis *f. rotundatae* Gyel. sed laciniae thalli versus periphaeriam plus minusve imbricatae. Apothecia numerosissima. Reactiones sicut in specie. Die zahlreich vorhandenen Apothezien sind zusammengedrückt, gehäuft.

Hab. Kidölt redves *Picea* törzsén a Grunik lejtőjén a Magas Tátrában, ca. 1450 m, Liptó vm (Timkó, no. 3789. Typus sub *Parmeliops. ambigua*).

f. leprosa And. in Hedwigia LXIV, 1923, p. 265.

Fast das ganze Lager ist in Soredien aufgelöst. Nur an den peripherischen Teilen kann man Spuren von Lagerlappen bemerken.

Hab. Ad truncos quercuum in monte Leánykő, prope Jólész, com. Gömör (Lojka, sub *Imbricaria diffusa*); Mátra, *Carpinus* száraz tuskóján a Disznókő lejtőjén Ohuta mellett, Heves vm, ca. 650 m (Timkó, sub *Parmeliops. ambigua* no. 4568).

Parmeliopsis subambigua Gyelnik n. sp.

Thallus stellatim laciniatus, laciniis primariis angustis, circ. 0,5 mm latis, linearibus, sejunctis, laciniis adventivis deficientibus, superne viridis, opacus, sat levis, flavescenti-sorediosus (primum viridi-papillosus, papillis demum soredialibus, grosse granulosis), subtus pallescens, Sterilis. Thallus superne K + flavescens, C —, KC —. Medulla K —, KC —, C —. Soredia K + flava, KC —, C —.

Similis *P. ambiguae* (Wulf.) Nyl. sed soredia alia et thallus subtus pallescens non nigrescens, etc.

U. S. A. Maryland, Anne Arundel Co., Bent Oale, on *Pinus rigida* (C. C. Plitt. sub *Parmeliops. diffusa*. Typus).

Sect. **Pallidifera** Gyelnik n. sect. Thallus superne albidus, griseo-albidus, griseus, fuscescenti-griseus vel fuscescens.

Parmeliopsis pallescens (*Lichen pallescens* Necker, Delic. Gallo-Belgic. vol. II, 1768, p. 503) Zahlbr. Cat. Lich. Univ. VI, 1929, p. 15 (ubi syn.).

Thallus laciniatus, laciniis primariis laxis et satis imbricatis, vel densis et non imbricatis, laciniis adventivis deficientibus, superne plerumque albidus grisescensve, nonnunquam hic illic subfuscescens, sorediosus, sorediis pulverulentis, albis, maculiformibus, subtus olivaceo-fuscus vel nigrescens. Medulla K —, KC + violascens, C —. Thallus superne K + flavus, KC + rubescens (flüchtig, sofort verschwindend), C —. Soredia K + flava, C —, KC + violascentes.

var. angustata Gyelnik n. var.

Laciniae thalli angustae, lineares, sejunctae, plerumque sat imbricatae, laxae, superne sorediosae, sorediis albis. Reactiones sicut in specie.

Exs. *Parmeliopsis aleurites* Nyl. et Norrl. Herb. Lich. Fenn. no. 34 (typus).

Hab. Fennia. In Tavastia, Evo, supra truncos pinorum decorticatos et dejectos (Norrlin apud Nyl. et Norrl. Herb. Lich. Fenn. no. 34, sub *Parmeliops. aleurit.* Typus); Suecia. Jämtl., Undersaker, Vällista (Vrang, sub *Parmelia hyperopta*). *Pinus pumilio* kérgén a kistarpatakvölgyi Oriási vizesés felett a Magas Tátrában, circ. 1430 m, Szepes vm (Timkó, no. 3602, sub *Parmeliops. hyperopta*); *Larix* tuskó kiálló gyökerein a kistarpatakvölgyi Oriási vizesés felett a Magas Tátrában, ca. 1420 m, Szepes vm (Timkó, no 3598, sub *Parmeliops. hyperopta*).

var. albosorediata Gyelnik n. var.

Laciniae thalli non sejunctae, versus apices rotundatae, palmato-ramosae. Soredia alba vel albida, pulverulenta. Reactiones sicut in specie.

Hab. Suecia arctica, Karesuando, Aggojavre (Lynge, sub *Parmelia hyperopta.* Typus); Magas Tátra (Bélai mészalpok), *Larix* és *Abies* törzsén a Nesselgrat lejtőjén ca. 1100 m a Feketeviz közelében, Szepes vm (Timkó, no. 2389, sub *Parmeliops. hyperopta*).

va. fuscisorediata Gyelnik n. var.

Soredia fusca, granulata. In ceteris ut in var. *albosorediata* Gyel.

Hab. Kidőlt redves *Picea* törzsén a Grunik lejtőjén a Magas Tátrában, ca. 1450 m, Liptó vm (Timkó, sub *Parmeliops. hyperopta.* Typus no. 3788).

Parmeliopsis diffusa (*Lichen diffusus* Web. Spicil. Fl. Goett. 1778, p. 250) Riddle in Bryologist vol. XX, 1917, p. 75; Zahlbr. Cat. Lich. Univ. VI, 1929, p. 13 (ubi syn.).

Thallus laciniatus, laciniis primariis versus apices plus minusve rotundatis, non separatis, laciniis adventivis deficientibus, superne albidus, albido-griseus, rosello-griseus vel griseus, primum tenuiter isidiatus, isidiis deindeque sorediabus, demum diffuso-sorediosus, sorediis granuloso-pulverulentis, thallo concoloribus, subtus pallidus albidusve. Medulla K + citrina, KC —, C —. Thallus superne K + aurantiaca, KC —, C —. Soredia K + aurantiaca, KC —, C —.

Das Lager wird erst (nach dem Rand hin gut bemerkbar) von feinen papillös-zylindrischen Isidien besetzt, die sich dann später zu Soredien auflösen. Endlich ist die Lageroberseite ganz in Soredien aufgelöst.

f. albidula Gyelnik n. f.

Thallus albidus vel griseo-albidus.

Exs. *Cetraria aleurites* Fl. exs. Austro-Hung. no. 1946 (typus); *Parmeliopsis aleurites* Krypt. exs. no. 2462.

Hab. Tirolia centralis, in pinetis (*Pinus silvestris*) ad Trins in valle Gschnitz, 1300 m s. m. (Kerner, no. 1946 in Fl. exs. Austro-Hung. Typus sub *Cetr. aleurites*); Austria inferior. Ad corticem *Pinorum* in pinetis siccis supra Türnitz ad Lilienfeld, 600—800 m (Suza in Krypt. exs. no. 2462, sub *Parmeliops. aleurit.*); Rybnik (Stein, sub *Imbricaria aleurit.*); Württemberg, Röthenbach (Wälde, sub *Cetraria aleurit.*).

f. roseola Gyelnik n. f.

Thallus roseus.

Exs. *Parmelia aleurites* Schaer. Lich. Helv. no. 489 (typus).

Hab. Circa Vire misit cl. Pelvet (Schaer. in exs. cit.).

Parmeliopsis marylandica Gyelnik n. sp. (= *P. angustior* Nyl.?).

Thallus laciniatus, laciniis primariis praesentibus, numerosis, angustis, vulgo 0,75—1 mm latis, linearibus, planis, stellato-divisis, laxis, sat imbricatis, lobis adventivis deficientibus, superne albido-griseus vel fusciculo-griseus, sat levis, opacus, esorediosus, non isidiosus, K + flavus deindeque aurantiacus post 24 horas rubiginosus, KC —, C —, subtus reticulato-rugosus, rhizinosus, pallescens vel albescens, rhizinis fuscis vel nigrescentibus. Apothecia in superficie thalli stipitata (usque ad 2 mm). Discus fuscus. Margo thallinus crenulatus. Hymenium hyalinum, J + coeruleum. Sporae ellipsoideae, hyalinae, monoblastae, 3—4 × 5—6 μ. Medulla alba, K + flava deindeque aurantiaca (post 24 horas rubiginosa), KC —, C —. Gonidia pleurococcoidea, viridia, globosa vel subglobosa, circ. 8—13 μ magna.

U. S. A. Maryland, Anne Arundel Co., Bent Oale, on *Pinus rigida* (C. C. Plitt, sub *Parmeliops. aleurit.* Typus).

Clavis specierum omnium.

(*P. subsoredians* und *P. angustior* nur nach der Beschreibung, da ich keine Exemplare sah.)

1 a. Thallus superne viridis vel luteolo-viridis. (Sect. *Viridifera* Gyel.)
  2 a. Thallus subtus pallescens.
    P. subambigua Gyel.
  2 b. Thallus subtus nigrescens.
    3 a. Thallus lineari-divisus, divisionibus subimbricatis, non discretis, inaequalibus. Species autonoma?
      P. subsoredians Nyl.
    3 b. Thallus lineari-divisus, divisionibus divergentibus, planis, discretis.
      P. ambigua (Wulf.) Nyl.
1 b. Thallus superne albidus, griseus vel fuscescens et K + flavus. (Sect. *Pallidifera* Gyel.)
  2 a. Medulla K —, KC + violascens. Thallus superne albo-sorediosus.
    P. pallescens (Neck.) Zahlbr.
  2 b. Medulla K + flava vel citrina.
    3 a. Thallus superne demum albido-sorediosus.
      P. diffusa (Web.) Riddle.
    3 b. Thallus esorediosus.
      4 a. Thallus et apothecia adpressa.
        P. angustior Nyl.
      4 b. Thallus laciniis laxis, apotheciis stipitatis.
        P. marylandica Gyel.

Species nova generis Ganoderma Karst. e vulcano Kilimandjaro: Ganoderma Baumii sp. n.

Auctore Dr. Albert Pilát, Pragae.

Doctor Georgius Baum, zoologus Pragensis bene meritus, et sculptor dom. Fojt excursionem romanticam anno 1931 per currum automobilem parvum, aëre frigoricatum, in fabrica cechoslovenica „Tatra" dicta manufactum, a Praga usque ad promontorium Bonae Spei in Africa meridionali fecerunt. In suo itinere per continentem africanum (22 000 km) praeter alias res naturae etiam fungos legerunt. Pars rei materialis mycologicae in itinere deperdita est ita, ut solum pauca exsiccata determinandi causa obtinui. Inter exsiccata allata duas species generis *Ganoderma* inveni, quae in diversis locis lectae erant. Harum una maximi momenti est. Non possum ullas notiones in literatura de ipsamet invenire et ideo istam speciem sicut *Ganoderma Baumii* Pilát sp. n. in honorem lectoris, qui ipsam invenit et dua pulcherrima carposomata e silvis virgineis in vulcano Kilimandjaro attulit, describo.

Uberrima et maxime admirabilis vegetatio huius montis vulcanei iam multos scrutatores pellexit, qui autem fere solum floram phanerogamicam observaverunt, pro dolor cum nemo curam profundiorem perscrutationem mycologicam adhibuit; — ista certe est in silvis virgineis extraordinariter fecunda et valde admirabilis.

In pede montis quoque in declivibus humilibus in altitudine ca. 1100—1800 m s. m. agri incolarum sunt et plantationes plantarum uitilium extenduntur.

Circa 1800 m s. m. acris proclivitas incipit, quae in altitudinem ca. 3000 m s. m. ascendit. Ista pars montis silva virginea tropica cooperta est; — deinde iterum in declives humiles cum pratis alpinis mutatur et in directione ad verticem (Kilimandjaro duos vertices habet: Mawenzi 5355 m et Kibo 6010 m) nive obtectum vegetatio sensim sine sensu evanescit.

Species nova, quam in textu continuato describo, in illa silva tropica in altitudine ca. 2500 m s. m. inventa erat.

Ganoderma Baumii sp. sp. m. n.

Pileo laterali, semiorbiculari-elongato, ungulato, durissimo-lignoso, perennanti (saepe pileis 2—3 imbricatis-concrescentibus), 20—30 ≈ 9—11 cm, 4—8 cm crasso, in sectione fere triangulari, superficie crusta ganoidea, obscura, nigro-purpureo-badia, lucida ½—1 mm crassa, in partibus pilei juvenilibus pulchre lucida, in partibus adultis haud lucida, tecto.

Margine subacuto, usque subobtuso, in exemplaribus adultis subterne reliefo sterili, 3—4 mm lato, aliquando edito praetexto.

Tubulis irregulariter stratosis, huc illuc contextu tramali intermixto, 5—23 mm longis, tenuibus, regularibus, obscure brunneis.

Poris albis vel albidis, regulariter orbiculatis, minutissimis, solum 120—150 μ diametri. Dissepimentis 50—60 μ crassis, in fauce obtusis, haud dentatis.

Trama umbrina, lignoso-suberosa, paulisper radialiter fibrillosa, ramis ganoideis, durissimis, nigro-brunneis in sectione lucidis radialiter, praecipue parte basali, intermixta. Hyphis obscure brunneis, crasse tunicatis, 4—6 μ crassis, ramosis. Ramis hypharum lateralibus 2—4 μ crassis, minus crasse tunicatis, paulisper clarius coloratis, in contextu tubularum plus minus paralleliter contextis.

Sporis brunneis usque fere umbrinis, citriformiter fusoideis, in finibus ambis acutatis, membrana earum basi multum incrassata, laevi vel minutissime punctata, 13—16 ⩽ 7—9 μ, plerumque uni- vel pluriguttulatis.

Hab. ad truncum arboris frondosae speciei ignotae in silvis virgineis in declivibus vulcani Kilimandjaro in Africa orientali, in altitudine ca. 2500 m s. m. legit cel. doctor Georgius Baum, zoologus Pragensis bene meritus, cui speciem hanc dedicavi.

Ganoderma Baumii Pilát ad affinitatem proximam *Ganodermati Petchii* Lloyd pertinet, quam C. G. Lloyd a cel. Petch ex insula Ceylon obtinuit et in opere suo „Synopsis of the Genus Fomes", Cincinnati 1915, dicto in pagina 268 descripsit et in figura 605 illustravit.

Haec Ganoderma Petchii Lloyd quoque crustam laccatam et tubulos longos (usque 5 cm) habet, sed sporis ovoideis, 8—12 μ, abscissis, distincte asperis, distinguitur. Quoque *Ganoderma laccatum* Kalchbrenner affinis videtur, sed quoque sporas diversas habet et habitu suo paulisper distat.

Ganoderma Baumii Pilát in sectionem Lloydianam no. 73 — Fomes — Ganodermus pertinet, sed ab omnibus speciebus notis sporis admirabilibus, citriformiter fusoideis distat.

Unacum carposomatibus adultis beneque evolutis cel. Dr. Baum quoque unum carposoma juvenile, abnormaliter evolutum, mihi donavit. Tota superficies huius carposomatis crusta pulcherrima, lucidissima, obscure purpurea vel purpureo-brunnea, ganoidea tecta est. In trama distinctissime illi radii ganoidei, qui in parte basali oriuntur et ramis suis plurimis (in sectione) attenuatis ad marginem evanescunt, discernandi sunt.

Exemplaria multa speciei secundae generis Ganoderma, quae amicus meus Dr. J. Baum ex itinere suo africano attulit et in locis duobus valde remotis legit, confirmant, quod haec species in Africa orientali tropica valde divulgata est.

Monographiae cel. Lloydii secundum (Synopsis of the section Apus of Polyporus, Cincinnati 1915) in sectionem eius no. 103 pertinet et cum descriptione et cum icone arte photographica depicto no. 705 speciei *Ganodermae Oerstedii* Fries bene concordat.

Ganoderma Oerstedii Fries, Nov. Symb. Myc. pag. 63. — Saccardo Sylloge Fung. vol. VI, pag. 178. — Lloyd, Syn. sect. Apus, pag. 370.

Specimina mea semiorbiculariter-ungulata, sat tenua, supra plana, basi paulisper gibba, 10—15 ≷ 8—10 cm magna, basi 5—6 cm crassa, in pilei medio 2—3 cm crassa, parum concentrice sulcata, glaberrima, fulvescentia, superficie crusta resinacea tenuissima laccata lucidaque tecta, margine obtusa.

T r a m a sat spongiosa, suberosa, firma, sed submollis, fibrilloso-floccosa, umbrina.

T u b u l i haud stratosi, 4—7 mm longi, angusti, regulares, cum dissepimentis subtenuibus, in fauce obtusis.

P o r i pallidi subochracei, rotundati, 0,12—0,2 mm diam.

Sporae ovatae, basi truncatae, pallide-brunneae, punctato-verrucosae, 7—8½ ≷ 4½—6 μ.

Ad truncos arborum frondosarum in vicinitate urbis Julfae (Sudan) VIII. — 1931, et in silvis tropicis virgineis in declivibus montis vulcanei Kilimandjaro in duobus locis in altitudine ca. 2500 m s. m. leg. Dr. Georgius Baum.

Carposomata huius speciei solum annua sunt. In speciminibus veterioribus crusta resinacea paulisper recedit et superficies demum fere haud lucida est. Polyporum Oerstedii Fr. cel. Lloyd ut varietatem solum Polyporo fulvello Bres. ponit, quod probabiliter verum est. Synonymiam huius speciei in opere Lloydiano, supra citato, pp. 370—373 compare!

Observations on the structure and identity of Tulasnella anceps Bres. et Syd.

By Mary J. F. Gregor, Ph. D., Royal Botanic Garden, Edinburgh.

The classification of fungi which show affinities with two or more genera presents considerable difficulty to investigators, and a satisfactory solution of the problem can, as a rule, only be attained after a critical examination of many related forms. Such a study is much to be desired in the case of certain species which appear to be intermediate between *Tulasnella* and *Corticium*. The principal characters distinguishing these two genera are the texture of the receptacle, the size and form of the sterigmata and the method of spore germination. The receptacle of a typical *Tulasnella* is gelatinous or mucilaginous, the sterigmata are exceedingly large and swollen, and the basidiospores germinate by the formation of secondary spores. A typical *Corticium,* however, has a membranaceous or arachnoid receptacle, the sterigmata are not swollen and the spores germinate by means of a normal germ tube. Bourdot and Galzin (1928) have divided *Corticium* into a number of sections, one of which, the group Botryodea, contains species which may resemble *Tulasnella* in the form of their sterigmata and in their method of spore germination, but which are distinct from it in the texture of the receptacle. Donk (1931, p. 116) regards these forms as an isolated group, and has described a new genus for them — *Botryobasidium*. Notwithstanding his arguments, however, the writer is not at present disposed to accept his decision, since the differences between *Botryobasidium* and *Corticium* do not appear to be of sufficient magnitude and constancy to warrant the establishment of a new genus.

About twenty years ago Bresadola and Sydow named a new fungus, *Tulasnella anceps,* which they reported from a single locality in the north of Germany as an active parasite of Bracken *(Pteridium aquilinum)*. In the original description Sydow (1910, p. 490) drew attention to the membranaceous nature of the receptacle, which resembles that of a typical *Corticium*, but he stated that in all other respects the structure was characteristic of the genus *Tulasnella*. The sterigmata were said to measure 8—10 ⩾ 2—2,5 μ, while the basidiospores germinated by the formation of secondary spores. Bourdot and Galzin (1928, p. 242) transferred this species to the genus *Corticium,* including it in the section Botryodea but citing it as a synonym for *C. vagum* Berk. et Curt.; they have retained *C. solani* (Prill. et Del.) Bourd. et Galz. as a distinct species, although it is regarded by many mycologists as identical with *C. vagum*.

Whilst studying the diseases of Bracken in Scotland, the writer has had opportunities to observe *Tulasnella anceps* both on the host plant and in culture, and to examine material from several different localities. After comparing it with numerous herbarium specimens of *Corticium vagum* and *C. solani,* she is convinced that the last two species are closely allied to one another, if not identical, but that they are quite distinct from *T. anceps.* An examination of many basidia belonging to the Bracken fungus showed that the sterigmata were usually quite small, though they occasionally became distinctly swollen and ovoid in outline. The basidiospores germinated within 24 hours on a solid culture medium kept at room temperature: they gave rise to a germ tube from one or both ends of the spore, but no secondary spores were formed. Miss E. M. Wakefield of Kew has informed the author that the basidiospores may sometimes germinate by the production of secondary spores, but the exact conditions favouring this type of development have not yet been determined. In view of the fact that the swollen sterigmata and secondary spores are by no means of universal occurrence, and taking into consideration the membranaceous texture of the receptacle, it seems advisable to follow Bourdot and Galzin in transferring this species to the genus *Corticium,* group Botryodea. It cannot, however, be regarded as identical with *C. vagum,* thus the original specific name must be retained and the fungus should in future be known as *C. anceps* (Bres. et Syd.) Gregor.

The original description by Sydow has been confirmed, except as regards the characters discussed above, but one interesting feature of this fungus does not appear to have been previously noted. In the British material large numbers of sclerotia are developed on the dead portions of the Bracken frond. These may measure up to 0,5 cm in diameter, though they are usually only about half that size. They are at first cream-coloured but later develop a dark brown outer wall; in section they are seen to consist of solid pseudoparenchyma. Identical bodies are formed on artificial media, their development commencing in monospore tube cultures after about ten days growth at room temperature. The outer wall is very resistant, and mature sclerotia can withstand immersion in 1 : 1000 mercuric chloride solution for 10 minutes, subsequently, after washing in sterile water, giving rise to typical cultures. On 5% malt extract agar the mycelium of this species is white and exhibits zonation. No basidia or spores have yet been developed upon any culture medium. A popular account of the disease symptoms produced on the Bracken by this fungus has already been published (Gregor 1932), and it is therefore not proposed to enter into any further details regarding the species until the completion of the Bracken disease investigation.

In conclusion the author wishes to express her indebtedness to Miss E. M. Wakefield of Kew both for the identification of the fungus *Corticium anceps,* and for her assistance in the taxonomic study of the species.

Zusammenfassung.

Auf Grund der Form und Größe der Sterigmen und der Keimungsmethode der Basidiosporen wird *Tulasnella anceps* Bres. et Syd. zu der Gattung *Corticium* gestellt. Die Bildung von Sklerotien sowohl auf der Wirtspflanze *(Pteridium aquilinum)* als auch auf künstlichen Nährböden wird hier zum erstenmal beschrieben.

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Etude d'un nouveau Scopulariopsis: Scopulariopsis grylli n. sp.

Par A. Sartory, R. Sartory et J. Meyer.

C'est en ensemençant le tube digestif d'un grillon des champs (*Gryllus campestris*) que nous avons pu isoler la moisissure faisant l'objet de ce mémoire; elle était accompagné d'un *Penicillium* vert que nous avons pu identifier comme étant *Penicillium crustaceum* Fries 1829. L'espèce qui nous occupe a été cultivée sur les milieux solides usuels (gélatine, gélose, décoction de pruneaux gélosée, bananes, carottes, pommes de terre, sérum solidifié, albumine d'oeuf coagulée, empois d'amidon), sur milieux liquides tels que bouillon, Liquide de Raulin acide et neutre, Raulin glucosé, saccharosé, lactosé, lévulosé, maltosé, lait, sérum liquide.

La plupart des milieux solides sont indiqués pour cultiver cette espèce. Nous donnerons la description d'une culture effectuée sur carotte:

A la température de $+22^{0}$ le mycélium se présente ténu, blanc, il forme un revètement soyeux abondant dès le cinquième jour; la culture prend un aspect mamelonné, hérissée de petits poils soyeux; les appareils conidiens apparaissent très vite (le 3ème jour); on retrouve ici quelques ressemblances, macroscopiquement, avec la culture de *Penicillium caseicolum* Bainier. Le huitième jour la carotte est complètement recouverte d'un manteau blanc.

A l'examen microscopique nous observons un mycélium dont les filaments ont des calibres inégaux variant entre 2 et 5 μ; l'extrémité libre du mycélium est légèrement conique, souvent terminée par un petit étranglement qui soutient une conidie terminale ronde, parfois légèrement ovalaire de 5 μ de long sur 4 μ de large et comme séparée par un septa du filament; cette conidie est entourée par une membrane à double contour plus épaisse que celle du filament et qui sert d'enveloppe à la conidie. Il ne tarde pas à se former de nouvelles conidies qui constituent ainsi des chaines parfois très longues (15 à 16 conidies). En vieillissant elles s'échinulent, se chargent d'aspérités caractéristiques, elles restent blanches; quand elles ont atteint leur maximum de croissance elles mesurent de 6 à 8 μ. Ces formes pourraient être considérées comme des *Monilia*. Mais ce n'est pas tout. En certains points sur le trajet d'un filament mycélien nous voyons se produire de multiples ramifications non cloisonnées (formes pectinées) puis d'autres cloisonnées qui s'amincissent légèrement à la partie supérieure et supportent un nombre variable de stérigmates (dimensions variant de 15 à 35 μ) (2, 3, 4 et même plus). Ces formes grandissent, les phialides se chargent de conidies parfois fort nombreuses, constituant des bouquets de pinceaux (forme penicillöide) (Fig. 1, 2, 3, 4). Ces coni-

Scopulariopsis grylli.

dies elles aussi s'échinulent, se hérissent parfois de piquants et d'aspérités. Dans les vieilles cultures sur carotte, pommes de terre, banane les formes penicilliennes semblent disparaitre et nous n'observons plus que des formes *Monilia* (Fig. 5, 6, 7, 8, 9, 10, 11).

Enfin dans de vieilles cultures sur navets nous ne constatons plus que des rudiments d'appareils conidiens: sur un filament principal nous trouvons des ramifications s'amincissant, puis formant une petite ampoule supportant une seule conidie à membrane très épaissie (Fig. 12) peu ou pas échinulée et contenant des guttules de graisse et du glycogène. Ces formations sont susceptibles de germer sur milieu neuf et donnent les formes indiquées ci-dessus. Parfois aussi sur pommes de terre acides (cultures âgées de 20 à 36 jours) nous observons des formes *Monilia*, mais ici le support de base très cloisonné (Fig. 13) renferme d'énormes guttules de graisse décelables par l'orcanette acétique, le colorant de Guéguen ou l'acide osmique.

Sur gélatine les mêmes formes sont visibles mais ici le développement ne peut pas être suivi longtemps car la liquéfaction du milieu a lieu le 8ème jour. Sur les parois du tube nous appercevons des filaments rampants très cloisonnés ou les formes *Monilia* dominent.

Sur gélose rien de particulier à signaler: la culture est luxuriante dès le deuxième jour (à + 22°); la couleur de l'organisme reste blanche, la gélose fonce un peu.

Sur décoction de pruneaux gélatiné la culture est abondante; on aperçoit des formes conidiennes en pinceaux très nombreuses. La liquéfaction du milieu se produit le 7ème jour.

Sur albumine d'oeuf le développement est nul ainsi que sur sérum de boeuf coagulé.

Sur empois d'amidon la culture est peu luxuriante, ce n'est qu'après 7 jours que nous percevons un léger duvet blanc: à l'examen microscopique, formes penicilliennes et *Monilia*. Pas de liquéfaction de l'amidon même après deux mois.

En ce qui concerne les milieux liquides sucrés, on peut constater aisèment que le Raulin glucosé et le Raulin saccharosé sont de beaucoup les meilleurs milieux. Dès le deuxième jour, à la température de + 22°, nous constatons un début de culture superficielle, blanche, qui s'élargit de plus en plus et forme le 12ème jour un voile couvrant tout le substrat (matras de 60 cc.). La culture est blanche et garde sa couleur, légèrement mamelonnée couverte de petits poils blancs qui sont des hyphes dressées le plus souvent fertiles. Les formes penicilloïdes dominent. Les conidies s'échinulent en vieillissant et mesurent de 5 à 8 μ; elles sont sphériques ou légèrement ovales. Sur le bord du matras le mycelium grimpe activement; ici les appareils reproducteurs sont souvent du type *Monilia*. A la partie inférieure du voile nous constatations un plissement intense ressem-

blant à une masse cérébriforme colorée en jaune, tout d'abord pâle, puis tirant ensuite sur le jaune canari. Sur saccharose les mêmes constatations ont pu être faites.

Sur lévulose le développement est presque nul de même que sur galactose.

Sur maltose développement lent mais très apparent dès le 10ème jour à + 22°. Sur Lactose pas de culture.

Le champignon fait fermenter le glucose; il est sans action sur les autres sucres.

Le lait est un excellent milieu: dès le 5ème jour, à + 22°, un voile se forme qui s'épaissit formant bouchon; les filaments mycéliens grimpent sur tout le pourtour du tube donnant des appareils conidiens (forme penicillienne et *Monilia*) nombreux. Le lait est coagulé le 12ème jour; la précipitation de la caséine a lieu avec redissolution du caillot (en partie); il y a peptonisation de la caséine.

Conidies: Nous avons été frappés par la durée de vie des conidies de ce champignon: nous avons pu conserver plus d'une année ces éléments avec pouvoir de germination non amoindri même quand le milieu de culture était presque réduit à néant.

Faut il voir dans la constitution de la membrane de ces appareils reproducteurs, fortement cellulosique, recouverte de plus d'aspérités qui ne sont nullement dues à la présence de sels d'oxalates de chaux ou d'autres produits minéraux, un manteau protecteur qui fait de ces éléments reproducteurs des formes de résistance capables de subsister très longtemps? Nous le croyons volontiers.

Classification. Après culture de l'organisme en goutte pendante sur Milieu de Raulin glucosé, et par l'examen des diverses cultures sur les milieux précités nous pouvons dire que ce cryptogame appartient au genre *Scopulariopsis:* nous proposons de le désigner sous le nom de *Scopulariopsis grylli* n. sp.

I. Ce champignon végéte fort bien sur tous les milieux nutritifs solides usuels (carotte, pomme de terre, banane, décoctions de fruits gélatinées, betterave).

II. Il liquéfie la gélatine du 7ème au 8ème jour, il végéte mal sur albumine d'oeuf et sur sérum coagulé; il ne liquéfie pas l'empois d'amidon.

III. Les milieux liquides les plus favorables à la croissance sont: le milieu de Raulin saccharosé et glucosé; l'organisme fait fermenter le glucose, est sans action sur les autres sucres.

IV. Il coagule le lait vers le 12ème jour en précipitant la caséine et peptonisant partiellement cette dernière.

V. L'optimum cultural semble compris entre + 20° et + 24°; plus de végétation à + 35°.

VI. Ce champignon appartient au genre *Scopulariopsis* et nous le désignerons sous le nom de *Scopulariopsis grylli.*

Nous rappelons pour mémoire que Delacroix[1]) en 1897 a décrit un parasite trouvé sur le grillon des champs sous le nom de *Monilia penicillöides* Delacroix; il diffère essentiellement du *Scopulariopsis* que nous décrivons dans le présent mémoire.

Dans le *Penicillium penicillöides* Vuillemin alias *Monilia penicillöides* Delacroix les spores sont jaunâtres, mesurent 6 à 7 μ sur 4,5. Cette dernière espèce se rapproche de *Penicillium anisopliae* et *P. Briardii.*

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[1]) Delacroix: Quelques espèces nouvelles, Bull. Soc. Mycol. t. XIII, p. 114, 1897.

Etude d'un nouveau champignon du genre Fusarium: Fusarium eucheliae.

Par A. Sartory, R. Sartory et J. Meyer.

L'espèce qui fait l'objet de ce mémoire a été isolé du tube digestif de chenilles vivant sur le Séneçon de Jacob; elle appartient au genre *Fusarium*. Nous avons fait une étude botanique complète de cette espèce par examen microscopique de cultures en goutte pendante sur milieu de Raulin ordinaire et de plus en faisant croître le champignon sur les principaux milieux usuels liquides et solides employés en Mycologie.

Examen en goutte pendante: Mycélium abondant, rampant, cloisonné, toujours blanc quel que soit le milieu employé. Filaments fertiles dressés cloisonnés. Quant aux appareils reproducteurs, les conidies prennent naissance soit à l'extrémité d'un filament légèrement renflé (Fig. 1); nous constatations alors la présence d'un bouquet de conidies arquées, sans cloisons au début puis par la suite, cloisonnées, nous apercevons des conidies libres qui ont été détachées par montagnisation. Souvent ces conidies naissent seules, à l'extrémité d'un filament non ramifié (Fig. 3); souvent aussi nous apercevons sur cette conidie isolée un bourgeonnement; il grandit peu à peu et donne une seconde conidie en forme de croissant, nous voyons (Fig. 4) ce mode de formation des conidies. Parfois sur un filament principal cloisonné nous distinguons des ramifications secondaires qui se ramifient à leur tour pour donner à leur extrémité des conidies (Fig. 5). A maturité complète ces conidies possèdent 3 cloisons (Fig. 6). Parfois un filament principal se gonfle en ampoule; puis cette ampoule subit une dépression formant 2 ou 3 spicules arrondis sur lesquels s'insèrent des conidies d'abord à 2 puis à 3 cloisons (Fig. 7). Les dimensions des conidies sont variables; elles peuvent facilement aller du simple au double (de 28 à 65 μ de long sur 5 à 6 μ de large).

Si nous laissons vieillir les cultures, nous pouvons constater au bout de 25 à 30 jours des formes de souffrance, véritables chlamydospores à double membrane fortement épaissie. Ces formes sont souvent terminales et simulent des formes oidiennes (Fig. 8). Cependant certaines de ces chlamydospores sont intercalaires. Nous n'avons jamais constaté la présence de sclérote.

Optimum cultural: Il a été recherché en cultivant ce champignon d'une part sur Bois de réglisse, d'autre part sur carotte à des températures comprises entre + 15° et + 42°. Il est situé entre + 24° et + 26°.

L'espèce cesse de végéter à + 35°.

Etude biologique: Le *Fusarium* se trouvait en végétation sur les milieux suivants: Raulin gélatiné, carotte, pomme de terre, pomme de terre glycérinée, pomme de terre acide (à 2 % d'acide lactique), gélose, empois d'amidon de riz à 2 %, banane, décoction de pruneaux gélatinée, betterave, sérum coagulé, albumine d'oeuf en ce qui concerne les milieux solides, Raulin normal, Raulin neutre, Raulin glucosé, lévulosé, galactosé, glycériné, sur bouillon pepto-glycériné, sur lait quant aux milieux liquides.

Disons de suite que sur albumine d'oeuf et sur sérum coagulé, la croissance est très faible et que nous ne constatons qu'un très léger duvet, difficilement perceptible; cependant nous notons à l'examen microscopique sur sérum quelques filaments cloisonnés et quelques conidies elliptiques ou en forme de lame de couteau recourbée et pointue à l'extrémité (Fig. 9 et 10). Elles ne se cloisonnent que très tardivement (12 à 15 jours). Sur albumine d'oeuf les faits sont à peu près semblables; présence de conidies très allongées et moins arquées que sur les milieux nutritifs usuels (carotte, pomme de terre).

Milieux solides:

Culture sur carotte à + 24°: Le début de la végétation se manifeste au bout de 36 heures (alors qu'à + 18° nous n'apercevons encore rien), sous la forme d'un petit point blanc qui, le 4 ème jour, donne une colonie plus grande, s'étalant. Le 6 ème jour, le $^1/_4$ de la surface du milieu est envahi. Il se forme un gazon blanc; les appareils reproducteurs conidiens sont en voie de formation. Le 11 ème jour toute la carotte est recouverte par le mycélium du champignon et sur le pourtour du tube nous constatations la présence de filaments rampants qui arrivent à la moitié du tube de culture; de même qu'à la partie inférieure du tube de Roux on aperçoit un voile blanc formé à la surface de l'eau disposée pour maintenir l'état hygromètrique. Ce mycelium reste blanc. Le 17 ème jour le tampon de coton est atteint par le mycelium toujours blanc. Nous insistons sur ce point que la culture demeure toujours blanche.

A l'examen microscopique on voit des appareils reproducteurs représentés par des bouquets de conidies, des conidies isolées toutes arquées et le plus souvent munies de 3 cloisons. A l'intérieur quelques guttules graisseuses.

Après deux mois de culture le champignon ayant cesser de progresser, le tampon de coton est très friable; on voit nettement une modification de la cellulose.

Pomme de terre ordinaire: L'évolution de la culture se fait un peu plus lentement; mêmes aspects microscopiques et mêmes observations déjà formulées pour la carotte.

Pomme de terre glycérinée: Culture assez luxuriante dès le 3 ème jour. Nous avons ici un détail microscopique à signaler. Nous avons

Fusarium eucheliae.

été frappés de constater sur de vieilles cultures de 35 jours que certains filaments (Fig. 12) s'enroulent en spirales, les unes à 3 ou 4 tours de spires, les autres plus développées à 7 et 8 tours de spires. Si on laisse vieillir les cultures durant 2 mois et plus, nous n'avons pu constater autre chose. Quelle est la signification de ces formations? Serai-ce le début d'un périthèce; rien ne nous permet de l'affirmer, ni de l'infirmer. Jamais nous n'avons constaté ces formations sur d'autres milieux.

Gélatine en stries: Les colonies sont circulaires, atteignent 3 à 4 mm. dès le 2ème jour, 1 cm dès le 4ème jour; la culture est toujours blanche; elle finit par former un tapis blanc, uniforme, sans aucun plissement. Sur tout le pourtour du tube des filaments ramifiés montrent à l'examen microscopique de nombreuses conidies. La liquéfaction du milieu se produit le 14ème jour. Le mycélium reste blanc, la gélatine n'est jamais pigmentée. A l'examen microscopique il n' y a rien de particulier.

Gélatine en piqûre: La culture est semblable; la liquéfaction débute le 14ème jour.

Raulin normal gélatiné: Même aspect.

Gélose: Cultures similaires à celles obtenues sur gélatine.

Amidon de riz: Milieu peu favorable; pas de liquéfaction.

Banane: Excellent milieu comparable à la carotte.

Milieux liquides:

Milieux sucrés: D'après la vigueur et l'étendue des cultures on peut ranger les sucres les mieux assimilables par le champignon dans l'ordre suivant: Glucose, Saccharose, Maltose, Lactose, Galactose.

Sur milieux glucosés et saccharosés nous constatons l'abondance de filaments toruleux (Fig. 13); sur milieux lactosés des filaments très souvent renflés en massue et parfois cette massue supporte elle-même 2 ou plusieurs prolongements terminés par des ampoules en forme de massues allongées et pointues à leur extrémité (Fig. 14).

Lait saturé de craie: Dès le 3ème jour début de végétation, voile assez bien formé le 6ème jour; pas de coloration. Début de coagulation de 6ème jour; coagulation complète le 8ème jour. A partir de ce moment dissolution de la caséine et peptonisation de cette dernière. Le 20ème jour la caséine est totalement digérée.

Sur bouillon dès le deuxième jour colonies blanches; le 5ème jour voile blanc uniforme; le 10ème jour celui-ci couvre toute la surface du milieu. Le mycélium rampe sur les parois du verre et atteint le 18ème jour le tampon de coton. La culture est toujours blanche sans plissement; pas de pigmentation à la partie inférieure. Le trentième jour on constate un arrêt de la végétation. Le tampon de coton est attaqué et se réduit en particules poussièreuses.

Conclusions: Ce *Fusarium* végéte sur tous les milieux usuels utilisés en Mycologie. Son optimum cultural est compris entre + 22° et + 25°. Il liquéfie la gélatine, coagule le lait: il y a précipitation de la caséine et peptonisation de cette dernière. Sans action sur l'amidon et l'albumine d'oeuf. Il produit dans les vieilles cultures des chlamydospores et sur la pomme de terre glycérinée des filaments spiralés très caractéristiques. Il n' y a pas de sclérote. Nous considérons ce champignon comme une espèce nouvelle et nous proposons de lui donner le nom de *Fusarium eucheliae.*

Species nova vernalis generis Tricholoma: Tricholoma Kavinae.

Auctoribus A. Pilát et R. Veselý, Pragae.

(Cum tab. III—IV.)

In textu continuato mirabilem fungum vernalem describimus, quem in duobus locis in Bohemia centrali annis 1926 et 1932 invenimus et qui hoc anno in magna multitudine in foris olitoriis Pragensibus vendebatur. Descriptionem huius speciei in litteratura mycologica vane querebamus et ideo illum ut *Tricholomam Kavinae* sp. n. describimus.

Tricholoma Kavinae Pil. et Ves. sp. n.

Pileus 6—9—14 cm diam. margine *tenuiter* carnosus sed non involutus, paulisper deflexus, plane convexus dein expansus et late umbonatus, primo pure *albus*, dein *albidus*, centro *sublutescens* dein *totus pallide subochraceus* vel *alutaceo-stramineus*, non hygrophanus, *sericeo-nitens*, epicute distincta usque *ad centrum secernibili* tectus, glaber, levis, adultus saepe paulisper in centro diffractus.

Stipes *conspecte longus et tenuis*, 10—15 cm longus, 6—8 mm crassus, centralis, regulariter cylindraceus, rectusque, basi plerumque *conspecte caepiforme incrassata*, *albus* vel albidus, superficie fibrillosus, primo fere solidus, dein anguste fistulosus.

Lamellae confertae, 7—9 mm altae, late adnexae usque *paulisper postice decurrentes, non sinuatae, albae,* acie non dentatae immutabiles.

Sporae in cumulo albae.

Caro alba immutabilis, odore *grato,* sapore miti.

Sporae hyalinae, ellipticae, basi paulisper contractae, membrana levi, 6—7 ≈ 3—4 μ, plasma homogenea usque granulosa repletae.

Basidia 10—20 ≈ 7—9 μ, tetrasterigmatica. Sterigmata 4—5 μ longa.

Cystidia solom in acie lamellarum sparsissima, fusoidea usque lageniformia, tenuiter tunicata, apice non incrassata, 26—45 ≈ 10—14 μ magna, 20—30 μ prominentia.

Hyphae tramae lamellarum tenuissime tunicatae, hyalinae, 5—7 μ crassae.

Epicutis ex hyphis similibus ut trama, solum paulisper densius intricatis, 5—10 μ crassis, composita.

Hab. in margine silvae frondosae prope Řevnice Bohemiae centralis fine mens. Mai 1926. leg. R. Vesely et in silva „Kersko" dicta prope Český Brod, Bohemiae centralis, 26. V. 1932, in querceto Tiliis intermixto leg. J. Sýkora.

Photo Pilát.

Tricholoma Kavinae Pil. et Ves. Exemplar quod cl. J. Sýkora prope Český Brod. 26. V. 1932 legit, in magn. nat.

Photo Pilát

Tricholoma Kavinae Pil. et Ves. In silva frondosa prope Český Brod 26. V. 1932 leg. J. Sykora. Magn. nat.

Fine mens. Maii et initio mens. Junii 1932 hic fungus admirabilis in magna multitudine in foris olitoriis pragensibus (Uhelný trh et Tylovo náměstí) sub nomine "fungus majalis falsus" vendebatur. Hi fungi in vicinitate urbium Černý Kostelec in Bohemia centrali, et Bor. Sv. Mikuláš in Slovakia occidentali lecti sunt.

Fungus noster characteribus suis genera *Tricholoma* et *Clitocybe* conjungit. Quamquam lamellae non sunt sinuatae, hunc fungum in genus *Tricholoma* ponimus, quia cystidia characteristica sunt. Habitu suo, in primis proceritate, stipite alto, tenui, basi conspecte caepiforme incrassata certas species generis Lepiota in mentem revocat, sed velo absolute absenti, lamellisque adnexis, subdecurrentibus longe distat.

Descriptionem huius fungi maxime admirabilis et quoque illustrationem eius in literatura mycologica invenire non possumus. Haec species probabiliter fortuite obviit et propterea adhuc non descripta est. In certis annis absolute deest, in annis aliis, opportunis, in magna multitudine crescit, sed vix 14 dies vegetat et dein e conspectu absolute abiit.

Species nostra *Tricholomae cnistae,* ut eam Quélet, Bresadola, Nüesch et Pilát describunt (*Tricholoma albo-flavidum* Peck) affinis videtur, sed stipite multo longiori et tenuiori, basi conspecte caepiforme incrassata. carne alba, immutabili, sporis basidiisque minoribus et quoque cystidiis brevioribus, apice haud muricellatis distat.

Quoque occurentia vernalis speciei nostrae maxime conspecta est. *Tricholoma cnista* (Fries?) Quélet in silvis subalpinis et in pratis alpinis usque in altitudinem super 2000 m s.m. obviit. Noster fungus contra in tempore primo vernali in regionibus calidissimis Europae centralis crescit.

Tricholoma Kavinae Pil. et Ves. bona species esculenta est. Nostram speciem cel. prof. Dr. C. Kavinae, mycologo pragensi bene merito, dedicavimus.

Einige Bemerkungen zu der Abhandlung von S. C. Teng, „Fungi of Nanking I".

Von K. B. Boedijn.

Über chinesische Pilze ist verhältnismäßig wenig veröffentlicht worden. Die meisten bisher veröffentlichten, dieses Gebiet betreffenden mykologischen Abhandlungen beschäftigen sich mit Mikromyzeten, während die größeren Pilze nur wenig Beachtung erfahren haben.

Es ist darum sehr erfreulich, daß jetzt auch das Studium dieser Pilze an Ort und Stelle in Angriff genommen wurde. Daß viele interessante Funde zu erwarten sind, ist über allen Zweifel erhaben. In „Contributions from the Biological Laboratory of the Science Society of China, Bot. Series Vol. VII No. 4, 1932, p. 85—127" hat nun Teng eine Abhandlung über Pilze von Nanking veröffentlicht, in der auch viele höhere Pilze berücksichtigt sind. Wie der Verfasser selber zugesteht, verfügt er nur über wenig Literatur, und darum kann es nicht wundernehmen, daß eine Anzahl Pilze unrichtig bestimmt worden sind. Für die Agaricaceae hat er speziell „Kauffman, Agaricaceae of Michigan" und „Atkinson, Mushrooms" benutzt. Es ist daher im voraus sehr unwahrscheinlich, daß man mit diesen amerikanischen Florenwerken richtige Bestimmungen chinesischer Pilze wird vornehmen können. Da aber bei den meisten angeführten Arten sich keine oder sehr spärliche Notizen vorfinden, läßt sich hierüber meistens wenig sagen. Es macht aber einen etwas befremdlichen Eindruck, daß so viele typisch amerikanische, meistens von Peck aufgestellte Arten, auch für China angegeben werden.

Auf p. 86 wird *Peronospora effusa* (Grev.) Rab. auf *Chenopodium album* und *Spinacia oleracea* angegeben. Die Form auf *Chenopodium* ist aber sicher *Peronospora variabilis* Gäumann, während die Kollektion auf *Spinacia* zu *Peronospora Spinaciae* Laubert zu stellen ist. Auf derselben Seite wird *Peronospora parasitica* (Pers.) de Bary auf *Brassica chinensis* angeführt. Hier handelt es sich aber sehr wahrscheinlich um *Peronospora Brassicae* Gäumann. Das auf p. 87 angeführte *Pyronema argentinum* Speg., welches an feuchten Kalkwänden wuchs, ist offenbar nichts anderes als *Pyronema domesticum* Sow. Auf p. 117—118 wird eine neue *Hypholoma*-Art als *H. cinnabarinum* sp. nov. beschrieben. Von dieser neuen Spezies ist eine sehr schöne farbige Abbildung beigegeben worden, aus der sofort ersichtlich ist, daß keine neue Art, sondern die schon bekannte *Psalliota crocopepla* B. et Br. vorliegt. Diese Art ist auch in Java nicht selten. Eine sehr gute Beschreibung findet sich bei Petch in „Annals of the Royal

Botanic Gardens, Peradeniya", Vol. IV, 1907, p. 55. Ich habe diese Art. als ich die Arbeit von P e t c h noch nicht kannte, irrtümlich als *Stropharia chrysocycla* B. et Br. für Sumatra angegeben, was ich bei dieser Gelegenheit berichtigen möchte. Ferner zweifle ich nicht daran, daß auch *Lepiota aurantiaca* Hennings in Monsunia I, 1900, p. 21, derselbe Pilz ist. Die Lamellen bleiben nämlich sehr lange weiß und färben sich erst spät schwarz. Die Art wird wohl am besten als eine *Psalliota* zu betrachten sein, obgleich Saccardo sie bei *Stropharia* eingereiht hat. Das auf p. 118 bis 119 neu beschriebene *Hypholoma stellatum* sp. nov. ist der Beschreibung nach zweifelhaft. Ob es sich hier überhaupt um eine *Hypholoma*-Art handelt, ist ganz unsicher. Die Angabe, daß die Sporen hellbraun bis braun gefärbt sind, stimmt nicht für diese Gattung. Man könnte auch an *Inocybe* denken. Unter dem Namen *Amanita phalloides* wird auf p. 121 ein Pilz angeführt, der einen bis 3 cm breiten rauchfarbigen Hut haben soll. Es ist kaum möglich, daß dieser unsere wohlbekannte *A. phalloides* vorstellt. Auf p. 124—125 wird endlich sogar eine neue Gattung der Lycoperdaceae, nämlich *Verrucosia* gen. nov. mit der neuen Art *V. corticola* sp. nov., aufgestellt. Ein Blick auf die beigegebene Tafel läßt aber sofort erkennen, daß es sich hier um gar keine Lycoperdacee, sondern um einen Myxomyceten handelt.

Wie Beschreibung und Abbildung aufs deutlichste zeigen, haben wir es mit *Lygogala flavo-fuscum* (Ehrenb.) Rost. zu tun. Diese neue Gattung und Spezies sind also ebenfalls zu streichen. Daß das ausschließlich aus Texas bekannte *Simblum texense* (Atk. et Long) Long in China vorkommen soll, wie auf p. 126 angegeben wird, beruht sicher auf einem Irrtum. Es kann nur *S. periphragmoides* Kl. in Betracht kommen. Ebenso unrichtig scheint die Angabe betreffs der nur aus Nordamerika bekannten *Dictyophora duplicata* (Bosc) Ed. Fischer auf p. 127 zu sein. Wahrscheinlich wird hier *D. indusiata* (Vent.) vorgelegen haben.

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Besprechung.

Arnaud, Gabriel et **Arnaud, Madeleine.** Traité de Pathologie végétale. Paris 1931/32 (Paul Lechevalier et Fils), 8°, vol. I et II, 1831 pp., 702 fig.; vol. III, 34 tab. color.

In zwei starken Bänden von insgesamt 1831 Seiten behandeln die Verfasser in detaillierter Weise die Krankheiten einer Reihe der wichtigsten Kulturpflanzen, wie insbesondere des Weines, der verschiedenen Obstbäume und hauptsächlichsten Beerenfrüchte, der Oliven-, Zitronen-, Feigen-, Maulbeerbäume usw., auch der Dattelpflanze und anderer Palmen. Wie überaus erschöpfend die Darstellung ist, geht am besten daraus hervor, daß sich allein die Behandlung der Krankheiten des Weines über mehr als 500 Seiten erstreckt. Eine auch nur annähernd ähnlich umfangreiche und zusammenfassende Darstellung der Krankheiten der in Betracht gezogenen Pflanzenarten hat die pflanzenpathologische Literatur bisher nicht aufzuweisen, so daß sich das vorliegende Werk zweifellos viele Freunde erwerben wird.

Besprochen werden bei jeder der behandelten Pflanzenarten nicht nur die durch Pilze und tierische Schädlinge hervorgerufenen Krankheiten, sondern auch die durch Witterungs- und andere Einflüsse bewirkten Erkrankungen. Die in jeder Hinsicht vorzügliche, klare und übersichtliche Darstellung wird durch überaus zahlreiche Textfiguren in wirksamster Weise unterstützt. Jedem der zahlreichen Einzelkapitel ist unmittelbar eine Übersicht über die den Gegenstand behandelnde wichtigste Literatur angefügt.

Den zwei starken Textbänden ist ein dritter aus 34 kolorierten Tafeln bestehender Band beigegeben, die prächtig gelungene Habitusbilder einer Reihe der wichtigsten Krankheiten bringen.

Der Unterzeichnete möchte dem verdienstvollen Werk eine weite Verbreitung wünschen. H. Sydow.

VI. International Botanical Congress.

According to a decision by the V International Botanical Congress at Cambridge in 1930, the Sixth Congress will be held in Holland in 1935. An Executive Committee has been formed, President of which is Professor Dr. F. A. F. C. Went (Utrecht), while Professor Dr. J. C. Schoute (Groningen) will act as Vice-President, Dr. W. C. de Leeuw (Bilthoven) as Treasurer and Dr. M. J. Sirks (Wageningen) as Secretary. The Committee has decided that the VI Congress will meet at Amsterdam, September 9th–14th 1935. Scientific Societies are kindly requested to reckon with these data in planning their own meetings.

VI. Internationaler Botanischer Kongreß.

Laut Beschluß des V. Internationalen Botanischen Kongresses in Cambridge 1930 wird der VI. Kongreß 1935 in Holland abgehalten werden. Für diesen Kongreß hat sich ein Vorbereitungsausschuß gebildet unter der Führung der Herren Prof. Dr. F. A. F. C. Went (Utrecht), Vorsitzender, Prof. Dr. J. C. Schoute (Groningen), stellvertr. Vorsitzender, Dr. W. C. de Leeuw (Bilthoven), Schatzmeister, und Dr. M. J. Sirks (Wageningen), Schriftführer. Der VI. Kongreß wird vom 9. bis 14. September 1935 in Amsterdam tagen. Wissenschaftliche Gesellschaften werden freundlichst gebeten, diese Daten bei der Feststellung ihrer Sitzungen berücksichtigen zu wollen.

VI. Congrès International de Botanique.

Le V Congrès International de Botanique à Cambridge 1930 a décidé que le Sixième Congrès aura lieu en 1935 en Hollande. Un Comité d'Organisation a été établi sous la direction de MM. le Professeur Dr. F. A. F. C. Went (Utrecht), Président, le Professeur Dr. J. C. Schoute (Groningen), Vice-Président, le Dr. W. C. de Leeuw (Bilthoven), Trésorier, et le Dr. M. J. Sirks (Wageningen), Secrétaire. Le VI Congrès se réunira à Amsterdam du 9 au 14 septembre 1935. Les Sociétés scientifiques sont priés de bien vouloir tenir compte de ces dates en fixant celles d'autres réunions scientifiques.

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(Ausgegeben am 15. September 1932.)